EFFECTS OF PROPOSED CLOSURE OF SOUTHWEST PASS ON THE REGIMEN OF VERMILION BAY LOUISIANA

Hydraulic Model Investigation

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PREFACE

The model investigation of the effect of the proposed closure of Southwest Pass on the salinities and hydraulics of Vermilion Bay, Louisiana, was conducted for the Louisiana Department of Public Works, which paid all costs. Authority for the Waterways Experiment Station to perform the work was contained in first indorsement dated 6 August 1954 to a letter dated 29 July 1954 from the Director, Waterways Experiment Station, to the Office, Chief of Engineers, subject "Proposed Model Study of Vermilion Bay, Louisiana."

The investigation was accomplished in the Hydraulics Division of the Waterways Experiment Station during the period December 1955 to December 1956. Waterways Experiment Station personnel who were actively engaged in the testing, analysis, and report phases of this investigation were Mr. Thomas J. Kinzer, Jr., project engineer, assisted by Messrs. A. J. Banchetti and R. V. Puckett. The investigation was conducted under the general supervision of Messrs. E. P. Fortson, Jr., G. B. Fenwick, and H. B. Simmons. This report was prepared by Mr. Kinzer.

During the course of the investigation, monthly progress reports were submitted to the Louisiana Department of Public Works, and numerous conferences were held between WES personnel and representatives of the Department of Public Works. Open house was held at the Waterways Experiment Station on several occasions so that Public Works Department officials and other interested parties could observe the operation of the Vermilion Bay model.

Grateful acknowledgment is made to Mr. E. L. Hendrix of the U. S. Geological Survey who computed the weekly prototype hydrographs used in this study. Special acknowledgment is also made to Mr. Hu B. Myers, chief engineer for the Louisiana Department of Public Works, and Mr. F. N. Hansen, district engineer for the U. S. Geological Survey, for their cooperation and assistance during the model investigation.

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SUMMARY

Use of Vermilion Bay to relieve the shortage of water for rice irrigation in southwest Louisiana has been proposed, but will require some means of reducing salinities in the bay during the irrigation season. Closure of Southwest Pass, which connects Vermilion Bay with the Gulf of Mexico, was proposed as a means of retarding salt-water flow into the bay, and a model study to investigate the proposal was initiated. Before the effectiveness of this plan could be determined for conditions which will obtain in the future, the effect on bay salinities of a reduction in fresh-water inflow as a result of the Old River Control Structure being constructed on the principal fresh-water source, the Atchafalaya River, had to be ascertained.

The model, built to scale ratios of 1:100 vertically and 1:2000 horizontally, reproduced 1860 square miles of the problem area, and included devices for simulating tides, tidal currents, salt-water movement, alongshore currents, fresh-water discharge, and fresh-water withdrawal.

The model tests showed that installation of the proposed closure of Southwest Pass under present conditions of Atchafalaya River discharge would reduce maximum salinities along the west side of Vermilion Bay to a maximum of 1700 ppm for a season of normal runoff and a maximum of 3600 ppm for a season of extremely low runoff. Corresponding maxima for present conditions with Southwest Pass open are in the order of 8000 ppm and 8800 ppm, respectively.

The tests also showed that, in addition to a major reduction in maximum salinities for conditions of both normal and low runoff, closure of Southwest Pass would retard the time of maximum salinity along the west side of Vermilion Bay so that maximum salinity would occur well after the peak of the irrigation season.

The ultimate reduction of the Atchafalaya River flow following completion of the Old River Control Structure will lessen the effectiveness of the Southwest Pass closure in reducing salinities along the west side of Vermilion Bay. Maximum salinity for a season of extremely low runoff, with the control structure in operation, would be of the order of 4400 ppm as compared to 3600 ppm for present conditions of Atchafalaya River flow. The control structure would not decrease the effectiveness of the closure in retarding the time of maximum salinity until after the peak of the irrigation season. Tests of the effect on these salinities of withdrawing 10,000 cfs from the north and west part of the bay demonstrated that the withdrawals would not affect the date of the peak salinity, but would increase the peak salinity by about 2000 ppm; low salinities would be further reduced.

The effect of closure of the pass on recession of a hurricane surge was studied, and though no definite conclusions were obtained, it appears that hurricanes severe enough to affect the salinity of the bay with the pass closed would occur very rarely.

EFFECTS OF PROPOSED CLOSURE OF SOUTHWEST PASS ON THE REGIMEN OF VERMILION BAY, LOUISIANA

Hydraulic Model Investigation

PART I: INTRODUCTION

The Problem

1. Although it may seem strange that a portion of the state of Louisiana, through which passes the drainage of a major part of the continent, should have water-supply problems almost as pressing as those of drainage and flood control, such is the nature of the agricultural and industrial demands upon its subsurface and surface waters that southwest Louisiana is experiencing deficiencies in its fresh-water supply. To add to this problem, the region's major streams empty into coastal basins or into the Gulf of Mexico, and when their flows are low because of scanty local rainfall, salt water enters their channels, contaminating both surface water and aquifers.

2. Rice irrigation accounts for nearly all the fresh surface-water usage in southwest Louisiana. The Louisiana Department of Public Works reports that the average total flow of surface fresh water into the coastal basins (Vermilion, Mermentau, and Calcasieu) of this region during the irrigation season of April-August, based on a 52-year period of record, is about 725,600 acre-ft, while the current needs are about 1,201,360 acre-ft.

3. The Department of Public Works has investigated several plans proposed to remedy this shortage. One of the most promising involves reducing salinities in Vermilion Bay and incorporating the bay into a reservoir system that would also include White, Grand, and Calcasieu Lakes (see plate 1) and would be supplied by the Atchafalaya River through the Intracoastal Waterway. The model study reported herein was concerned primarily with the part of this plan that proposes that Southwest Pass, which connects Vermilion Bay and the Gulf (see plate 2), be closed as a means of retarding salt-water flow into the bay.

4. A major portion of the Atchafalaya River flow consists of water

diverted from the Mississippi River through Old River. Because the amount of water diverted from the Mississippi is reaching proportions detrimental to interests below Old River, the Corps of Engineers is planning to stabilize the over-all amount of this diversion by means of a control structure on Old River. Since stabilization of the Mississippi River flow into the Atchafalaya might affect the salinities in the bay system adjacent to its mouth, this contingency had to be considered in the study of plans for reducing salinities in Vermilion Bay.

Purposes and Scope of the Model Study

5. The principal objectives of the model study were: (a) to determine whether the closure of Southwest Pass would reduce salinities in Vermilion Bay to concentrations permissible in irrigation; (b) if so, to determine the effects on the reduced salinities of withdrawing 10,000 cfs for irrigation and industrial use from the north and west parts of the bay; and (c) to obtain data for use, if needed, in evaluating the effects of the Southwest Pass closure on fish and wildlife. After the study was well under way, the question arose of what effect a hurricane tide might have on the improved bay system. Accordingly, determination of this effect was also included in the investigation.

6. To obtain the desired information, the Department of Public Works requested the following model tests:

- a. Hydraulic and salinity verification.
- b. Long-term salinity verification to 1955 hydrograph.
- c. Long-term salinity verification to 1954 hydrograph.
- d. Base test of 1954 published hydrographs repeated for two years.
- e. Tests of the effects of the Old River Control Structure on Vermilion Bay salinity with the 1954 hydrographs repeated for two years.
- f. Test of the effects of closure of Southwest Pass on Vermilion Bay salinity using 1954 published hydrographs.
- g. Tests of the effects of closure of Southwest Pass on Vermilion Bay salinity using 1954 hydrographs with Old River discharge routed through control structure, repeated for two years.

h. Test of the hydraulic effects of closing Southwest Pass.

i. Base test of 1955 hydrographs with Old River discharge routed through the control structure.

j. Test of the effects of closing Southwest Pass on Vermilion Bay salinity during a year of normal precipitation (1955) with the Old River flow routed through the control structure.

k. Test of the effects on bay salinity of withdrawing 10,000 cfs from the periphery of Vermilion Bay during a year of normal precipitation (1955) with Southwest Pass closed and the Old River discharge routed through the control structure.

l. Test of the effects on salinity in Vermilion Bay with Southwest Pass closed of the hurricane surge of 20 September 1947 superimposed upon conditions existing during a year of subnormal precipitation (1954).*

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* Hurricane "Audrey," one of the most severe of record, occurred over this area on 27 June 1957, after this study had been completed and the model dismantled.

PART II: THE PROTOTYPE

Location

7. Vermilion Bay is located on the coast of Louisiana, about 30 miles south of Lafayette and about 45 miles west of Morgan City (plate 1). The principal connection between Vermilion Bay and the Gulf of Mexico is Southwest Pass (plate 2), a rather narrow but deep channel about 6 miles in length; however, a second connection with the Gulf lies to the east through West and East Cote Blanche Bays and Atchafalaya Bay. Since conditions in any one of the bays affect (or even control) conditions in the adjacent bays, the entire bay system must be considered as a single unit in any study involving salinity intrusion.

Physical Characteristics

8. The total area of the bay system is about 650 square miles. Depths throughout the system are quite small, the maximum being of the order of 8 to 9 ft. In Southwest Pass the maximum depth is well in excess of 100 ft, but the controlling depth at the Vermilion Bay end is about 8 ft, and that at the gulf end, approximately 10 ft. The entire bay system is separated from the Gulf of Mexico largely by Marsh Island on the west and an extensive shell reef that extends almost unbroken from the east tip of Marsh Island to Point Au Fer. Although the general elevation of Marsh Island is quite low (about 2-3 ft above mgl), the south side of the island is bounded by a coastal ridge, or chenier, that rises to an elevation of about 5 to 6 ft above mgl. The general elevations of the extensive marsh areas that abut on the bay to the west, north, and east are also quite low, being approximately 2-3 ft above mgl for great distances back from the shore line of the bays.

Tides and Tidal Currents

9. The tides in this region of the Gulf of Mexico are of the mixed type, being semidiurnal when the moon is near the equator and diurnal when

the moon is in the tropics. The average semidiurnal range of tide in Atchafalaya Bay at Eugene Island (for location, see plate 3) is about 1.1 ft, and the average diurnal range about 1.9 ft. Since the mean diurnal range is approximately double that of the mean semidiurnal range, while the period of the diurnal tide is about double that of the semidiurnal tide, the velocities of tidal currents throughout the bay system are relatively constant unless affected by wind or other phenomena of a local nature.

Upland Discharge

10. Most of the upland discharge into the bay system is contributed by the main and Wax Lake outlets of the Atchafalaya River. The normal maximum discharge from these sources is of the order of 300,000 cfs, while the normal minimum discharge is about 40,000 cfs. Other tributaries of the system that contribute significant quantities of upland discharge, especially following heavy local rains, include the Vermilion River, Weeks and Petite Anse Bayous, and the Charenton Canal (see plate 2).

Salinity

11. The intrusion of salt water from the Gulf of Mexico into the bay system is of the frontal (or well mixed) rather than the wedge type; consequently, there is little difference between surface and bottom salinities at any location. The principal force involved in the vertical mixing of the salt and fresh water appears to be surface wave action, since the velocities of tidal currents throughout the system are too small to produce such complete mixing even though the depths are quite small. Because of the large area and shallow depths throughout the bays, local winds are very effective in producing choppy waves that promote mixing throughout the depth.

12. The average salinity of the bay system varies for the most part on a seasonal basis, and is inverse to the Atchafalaya River discharge, reaching a maximum at the time of minimum flow from the Atchafalaya and a minimum at the time of maximum flow. The effects of local runoff from the minor tributaries may reverse the seasonal trend for short periods of time

in certain portions of the bay system, but such effects appear to be insignificant in both extent and duration as compared to the seasonal trend. Salinities throughout the system have been reduced essentially to zero as a result of sustained high discharge from the Atchafalaya River, while maximum salinities of the order of 6 to 8 parts per thousand have been measured along the west and north sides of Vermilion Bay near the end of a period of sustained low Atchafalaya discharge.

13. After a period of high fresh-water discharge that has essentially freshened the entire bay system, the influx of salt water into the system appears to follow a fairly well-defined pattern. The initial intrusion occurs through Southwest Pass into Vermilion Bay; then the salt-water front fans out through Vermilion Bay and into West Cote Blanche Bay. By the time the salt-water front has reached the central portion of East Cote Blanche Bay, the Atchafalaya River discharge has usually decreased to such an extent that the salt water from the Gulf begins to intrude into the western portion of Atchafalaya Bay. Salt water intruding from this source apparently meets that intruding from Southwest Pass in the vicinity of Marone Point. This pattern is capable of considerable variation, however, depending on the local runoff into Vermilion Bay. The evidence that saline intrusion into Vermilion Bay through the Marone Point cross section lags behind that through Southwest Pass was the principal basis for belief that the closure of Southwest Pass would effect a reduction in the salinity of the bay complex.

Alongshore Currents in the Gulf of Mexico

14. Off the coast of Louisiana, the Gulf Stream flows in an easterly direction in the Gulf of Mexico. Since this might create a westerly setting, alongshore current, a salinity range was established about five miles offshore to determine the effect, if any, that this situation has on the distribution of the Atchafalaya discharge. Several salinity surveys were made on this range. These surveys showed that there is a westerly flowing current along the Louisiana shore that moves the Atchafalaya discharge westward, thus affecting the source salinity at the gulf end of Southwest Pass. Although there was no evidence from the offshore surveys that the

current reversed itself or ceased at any time, it was deduced from the model study that either a reversal or a cessation of the westerly current was the only feasible explanation of some of the salinity phenomena observed in Vermilion Bay (prototype).

PART III: THE MODEL

Description

Area reproduced

15. The Vermilion Bay model was a scale reproduction in concrete of approximately 1860 square miles of prototype area. As shown in plate 2, the area reproduced included a portion of the Gulf of Mexico adjacent to the southern coast of Louisiana, Marsh Island, Vermilion Bay, East and West Cote Blanche Bays, Atchafalaya Bay, the mouths of Vermilion River, Petite Anse and Weeks Bayous, the Atchafalaya River from Morgan City to its mouth, and the Intracoastal Waterway from Morgan City to the Vermilion Lock.

Features of model

16. The model included provisions for reproducing prototype tides, tidal currents, salt-water movement, alongshore currents, fresh-water discharges, and fresh-water withdrawals in the modeled area. Fresh-water discharges were measured by Van Leer weirs, and fresh-water withdrawals were measured by means of adjustable V-notch gates. Salt water for filling the gulf portion of the model, and for reproducing the tides therein, was stored in an underground sump equipped for mixing and controlling the concentration of the salt water. Extra roughness was added as needed in the form of metal strips.

Scale ratios

17. The model was constructed to linear scale ratios, model to prototype, of 1:100 vertically and 1:2000 horizontally, with a resulting slope scale of 20:1. Other scale ratios, computed from the linear ratios, were: area, 1:200,000; volume, 1:400,000,000; velocity, 1:10; discharge, 1:2,000,000; and time, 1:200. The salinity scale ratio was 1:1.

Appurtenances

Tidal equipment

18. Tides were simulated by means of a system composed primarily of a header between the model head bay and an underground sump, a discharge line supplying this header, and an automatic, electromechanical valve

between the sump and input point in the header. If the valve was closed, the input was entirely diverted to the model, causing a rapidly "flooding" tide; conversely, if the valve was completely open, not only would all the input return to the sump, but gravity flow from the model as well, causing a rapidly "ebbing" tide. The function of the tide-control machine was to position the valve so as to produce the proper ebb or flood for each instant of the tidal cycle. The apparatus was equipped with a recording device that permitted a visual check of the accuracy of the tide reproduction at all times.

Gages

19. Water-surface elevations were ascertained at hourly intervals during model operation by means of point gages graduated to permit reading to the nearest 0.001 ft in the model, which corresponded to 0.1 ft in the prototype.

Current meter

20. Current velocities in Southwest Pass were measured by means of a midget current meter. The meter consisted of five small cups about 0.02 ft in diameter, mounted on a vertical phonograph-needle shaft set in jeweled bearings. One of the five cups was painted white so that the number of revolutions of the meter could be counted visually. Revolutions per second of the meter were transferred to prototype velocity by means of a calibration curve. Calibration of the meter was checked at regular intervals to insure its correct operation.

21. Since the shallow depth of the model bays did not permit the complete separation of the two-tenth and eight-tenth depths that would correspond to the depths at which prototype readings were made, the velocity meter was used at middepth and these readings were compared with an average of the two prototype depths. The middepth model velocity was found to be identical with the integrated velocity measured in the prototype by means of a pole float.

Alongshore current

22. In order to reproduce in the model the alongshore current and its freshening effect upon the waters adjacent to Southwest Pass, a pipe was laid along the eastern end of the model gulf for the introduction of salt water, and a pit with a weir at its perimeter was provided at the

western end of the model gulf. The withdrawal of water over the weir drew the fresh water from Atchafalaya Bay westward, and the withdrawn water was replaced by salt water from both the alongshore-current pipe and the ocean head bay.

Prototype Data Requirements

23. Prototype data required for the adjustment and verification of a model to be used for studies involving salinity intrusion throughout the problem area fall into four general classifications: hydraulic data, short-term salinity data, long-term salinity data, and upland discharge data. Such prototype data as were available at the inception of the model study had been obtained sporadically over a wide range of conditions; therefore, it was necessary to formulate and carry out a program for collection of the data needed for the model study. The program was formulated by the Waterways Experiment Station and carried out by the Louisiana Department of Public Works.

Hydraulic data

24. A total of five tide-recording gages were maintained in the bay system for the duration of the prototype survey. Of these, three (at Cypremort and Salt Points, and Eugene Island) were used for model verification, and are shown in plate 3. The Eugene Island tide gage is maintained by the U. S. Coast and Geodetic Survey (USC&GS), while the other four gages were installed and maintained just for this study by the Louisiana Department of Public Works. Tidal data at these locations were needed for adjustment of the model tide generator to simulate properly tidal phenomena throughout the entire area under investigation. Records of current velocities and directions throughout a complete tidal cycle at the major control sections in the bay system (Southwest Pass, Marone Point, and Cypremort Point) were needed to insure that current velocities and directions in the model would agree with those of the prototype for similar conditions of tide and upland discharge. Current-velocity measurements at the three above-mentioned locations were obtained at hourly intervals for various points in depth. In addition to the tide and current data, the upland discharges of all significant tributaries to the bay system were determined as accurately as possible.

Short-term salinity data

25. The short-term salinity data consisted of salinity determinations throughout complete tidal cycles obtained concurrently with and at the same locations, depths, and time intervals used for current-velocity measurements. It was known in advance that the model would not reproduce such prototype salinities in a quantitative manner if the fresh-water discharges at the time of the observations were reproduced on a sustained basis, because prototype data then available indicated that the salinity at a given point in the bay system at a given time was the net resultant of the tide, upland discharge, and local wind conditions that had occurred for an appreciable period prior to the time of the measurements. However, salinity data of this nature were considered essential to demonstrate that the fluctuations (rather than the concentrations) of salinity with tidal phase at given critical locations were the same in the model as in the prototype.

Long-term salinity and
upland discharge data

26. Available prototype data at the inception of the model study indicated upland discharge into the bay system to be the controlling factor with respect to the extent and degree of salinity intrusion throughout the bays. Available data also indicated that the response of salinity concentration at any given point to changes in upland discharge was rather slow. This indicated a need for a large number of salinity-sampling stations with a fairly long period between sampling at a given station, rather than a limited number of stations sampled at close intervals. Accordingly, a network of 73 salinity-sampling stations (see plate 3) was laid out over the entire bay system, and sampling operations were carried out at all stations at intervals of from one to two weeks throughout calendar years 1954 and 1955. (The salinity stations were numbered from 1 to 76, but there were no stations corresponding to the numbers 47, 48, and 51.) The upland discharges of the main Atchafalaya River outlet and the Wax Lake Outlet were measured during this entire period, and the discharges of the remaining tributaries to the bay system were computed by the U. S. Geological Survey (USGS). These data comprised the principal basis for the salinity verification of the model described later in this report.

PART IV: VERIFICATION OF THE MODEL

27. Verification of the Vermilion Bay model consisted of: (a) hydraulic adjustment, (b) short-term salinity verification, and (c) long-term salinity verification.

Condition to be Reproduced

28. An equatorial tide was chosen for reproduction in the model, the tidal range at Eugene Island being 0.89 ft. The discharge of the Atchafalaya River measured at Krotz Springs, La. (see plate 1 for location), distributed between the Atchafalaya River and Wax Lake Outlet, was 41,500 cfs, a fairly low flow that resulted in a well-mixed salinity condition in the bays and no salt-water wedge in Southwest Pass.

Hydraulic Adjustment

29. Adjustment of the automatic tide control was accomplished through a cut-and-try process of adjusting the amount of up or down movement of the motorized valve for each portion of tidal cycle. The date for which data were reproduced was 17 January 1956.

30. After adjustment of the Gulf of Mexico tide had been accomplished, current velocities and tidal heights were observed in the bay portion of the model and found not to conform to prototype data. Additional roughness was added but this was ineffectual because of the low velocities. Flow in Southwest Pass, however, was responsive to changes in roughness.

31. Examination of the field data revealed that prototype wind conditions had affected the tidal elevations recorded at Cypremort Point and Southwest Pass. Therefore, only the tidal heights recorded at Eugene Island and Salt Point were used in the model verification. A comparison of these model and prototype tidal heights is shown in plate 4.

32. A comparison of the current-velocity measurements obtained in the prototype and in the model-verification tests is presented for surface, middepth, and bottom at Southwest Pass in plate 5, and for middepth

at stations off Cypremort Point and Marone Point in plate 6.

Short-term Salinity Verification

33. After hydraulic adjustment of the model was completed, a movable partition was placed in the model just outside the shell reef and across Southwest Pass to separate the simulated Gulf of Mexico and the bay system. The gulf was then filled with water having a salinity of 20,000 ppm, slightly greater than the highest ocean salinity observed in the prototype. The bay system was then filled to high-water level (HW) with fresh water. The tide machine was started and the river and bayou weirs were adjusted, after which the barrier separating the two bodies of water was removed.

34. Prototype salinity conditions represent an integration of the forces involved in tidal and fresh-water flows. In the model, where the fresh- and salt-water bodies were separated at the beginning of a test, operation for a considerable period of time was necessary before the forces of the fresh-water and tidal flows could become properly adjusted. Since the observations made in nature represented a transient condition and not a steady state, it was not necessary to run the model to stability. Therefore, salinity determinations were begun after 10 cycles of operation.

35. In general, the model bays tended to be more stratified than their prototypes. The addition of roughness did not change this situation because the model currents were not of sufficient velocity to cause mixing. It therefore appeared that some other agency was responsible for the mixing of the salt and fresh water. It was readily apparent that in nature the agency involved was the wind.

36. To determine whether wind would be similarly effective in the model, fans of various sizes were set to blow on the water. The fans did prove to be effective, and after many trials, it was found that the best arrangement was a battery of five 14-in. oscillating fans blowing obliquely down upon the water.

37. The salinity verification was an attempt to bring the salinity at Southwest Pass, Marone Point, and Cypremort Point into agreement with the observed prototype salinity by reproducing observed discharges. Plates 7, 8, and 9 show the results after approximately 170 tidal cycles. It can

be seen that the difference between surface and bottom maximum salinities at Southwest Pass was about 3000 ppm in the prototype, while in the model they were identical. This is believed due in part to an insufficient knowledge at the time of the effect of alongshore currents. It is probable that in the prototype the surface salinity was reduced by the westward drift of fresh water discharged by the Atchafalaya River.

38. The prototype measurements show both surface and bottom salinities at Marone Point to be higher than those at Cypremort Point. The model salinities at Marone Point were lower than those at Cypremort Point. Examination of the prototype records shows that at no time during the year 1955 were the Marone Point salinities higher than those at Cypremort Point. It was concluded that the prototype verification data represent an unusual condition, the cause of which lay outside the forces being reproduced.

Long-term Salinity Verification

39. The real test of the model's adequacy was the ensuing stage of long-term salinity verification in which it was attempted to determine whether the model, reproducing a repetitious tide and the observed or computed hydrographs for all tributaries, could be depended upon to reproduce the changing salinity picture observed in the prototype. The year chosen for this purpose was 1955 because continuous sampling had been done over the entire area for this period. The discharges reproduced in the Atchafalaya River were those measured at Krotz Springs, and since the model did not extend as far upstream as the separation of Wax Lake Outlet from the Atchafalaya River (see plate 2), the total Atchafalaya River discharge was distributed so that 20% passed through Wax Lake Outlet and 80% through the Lower Atchafalaya River. Hydrographs were not available for Vermilion River, Weeks and Petite Anse Bayous, and Charenton Canal; so weekly hydrographs were computed by the USGS. These hydrographs are shown in table 1.

40. For this first long-term salinity verification, model operation was begun with the salt water in the Gulf of Mexico and the fresh water in the bay system separated by a long sheet-metal gate extending from Marsh Island to Point Au Fer, and by a block in Southwest Pass. The model was started as of 1 January (prototype), which meant that the first few months,

during which high fresh-water discharges normally occur in the prototype and greatly reduce the bay system salinity, were an adjustment period during which the salinity pattern became established. The prototype low-salinity period occurred about cycle 280, and as the model test emerged from this low, the adjustment was about complete.

41. Surface salinities were measured at the stations where prototype measurements had been made. Samples were obtained at the same time of the tidal cycle and on the same date when prototype samples had been taken. Since the tides in the Gulf of Mexico are of the mixed variety, being sometimes diurnal and sometimes semidiurnal, while the model tides were all of the semidiurnal equatorial variety, it was necessary to devise a system to adapt the prototype sampling time to the model. This was done by determining the percentage of the time between high water and the preceding or succeeding low water at which the prototype sample had been taken. The model sample was then obtained at the same percentage of time before or after HW. Comparative model and prototype salinity surveys (year 1955) are shown in plates 10-55 and in table 2. The 1955 salinity verification is shown in plate 56 and in table 2.

42. With the model verified to the 1955 salinity condition, it was desired to reproduce the hydrograph of the driest year of record as a base condition with which to compare tests of improvement plans. The least local precipitation in the areas contributory to Vermilion Bay occurred in 1948, with low stages in the Mississippi River and consequently, in the Atchafalaya River. An alternate period was the year 1954, during which the Mississippi and Atchafalaya River stages were at an all-time low, although a few more inches of local precipitation were recorded in 1954 than in 1948. The Department of Public Works was of the opinion that 1954 was the better choice because prototype salinity data were available for 1954, but not for 1948.

43. Since salinity data were available for the year 1954, the use of 1954 conditions for the model really amounted to reverification of the model to a new annual condition. The 1954 weekly hydrographs are shown in table 3.

44. When reproduction of the 1954 annual salinity data was attempted, it was found that the summer increase in salinity began earlier in the

prototype than in the model, and that the prototype peak salinity not only preceded the model peak but was also higher. An attempt was made to correlate the earlier prototype salinity increase and higher peak for Vermilion Bay with such obvious factors as the mean daily level of the sea, the aggregate tributary hydrographs, and individual tributary hydrographs. No correlation was apparent in any of these cases. Finally, consideration was given to the fact that the salinity increase began at Southwest Pass and progressed to station 3 (see plate 3 for location of salinity stations) and then to station 40. This seemed to indicate that the water in the Gulf of Mexico adjacent to the mouth of the pass had increased in salinity and that the increase had progressed into the bay via Southwest Pass. The only known factor stabilizing gulf salinity at the mouth of the pass at a fairly low figure was the westerly flow of the Atchafalaya discharge along the continental shelf, caused by the backwash of the Gulf Stream. It appeared that if by the agency of the wind, or by some other means, the westerly flow of fresh water should be stopped, or its direction reversed, the salinity at the mouth of the pass would suddenly increase. Arrangements were made to reverse the direction of the offshore currents in the model, and the model salinity curves immediately began to follow those of the prototype. It was not possible to confirm by means of prototype observations that such current reversals occur in nature, but in the absence of other workable hypotheses, the current reversal was accepted, with reservations, as the cause of the salinity phenomenon observed. The reservations with which this hypothesis was accepted were tempered by the fact that if the current reversal was not the cause of the jump in salinity, its reproduction during tests of improvement plans would make the closure of Southwest Pass less effective, and it would thus act as a safety factor. It was therefore decided to retain the current reversal as a part of the standard testing procedure. The 1954 salinity verification is shown in table 4 and in plate 57.

PART V: BASE TESTS AND TESTS OF IMPROVEMENT PLANS

Salinity Base Test, Existing Conditions

45. After the model salinity verification had been accomplished, a test of existing conditions (base test) was conducted to afford a basis for evaluating the effects of improvement plans. In this test, samples were obtained every second week, and at local HW slack only. Instead of samples being taken at all salinity stations (plate 3), they were obtained only at the following stations in the bay system: 1, 3, 5, 13, 27, 29, 34, 40, 46, and 52. Salinities for this test are shown in plate 58 and in table 5.

Base Test Including Effect of Old River Control Structure

46. Since it was considered possible that the stabilization of Atchafalaya River discharge resulting from operation of the Old River Control Structure (see paragraph 4) might affect the salinity of the bay system, information concerning the salinities to be expected after the structure is completed, i.e., permanent future conditions, was desired so that improvement plans for Vermilion Bay could be evaluated realistically. In order to obtain this information from the model, computations of the flows that would be diverted from the Mississippi River and routed through the control structure according to the performance criteria for the structure were needed. The Office of the President, Mississippi River Commission (the agency in charge of construction and operation of the control structure), was requested to furnish computed flows through the structure under conditions similar to those that had prevailed in 1954, the conditions used in the base test. This was done, and a model test was conducted that was identical with the base test except that the Atchafalaya and Wax Lake hydrographs reflected the effect of the control structure. The duration of the test was two years, the second year being a repetition of the first year's hydrograph. The results of this test are presented in plate 58 and in table 5. Low and high salinity surveys for the two years are shown in plates 59 through 62. The following tabulation compares the maximum

salinity at the indicated stations for published and routed discharges.*

Effect of Old River Control Structure on Peak Salinities for 1954, Southwest Pass Open

Salinity Station (Plate 3)	Without Old River Control Structure: Date of Peak Salinity	Without Old River Control Structure: Peak Salinities ppm	With Old River Control Structure: Date of Peak Salinity	With Old River Control Structure: Peak Salinities ppm	Difference ppm
3	Oct 19	10,400	Oct 10	12,100	+1,700
5	Oct 25	10,800	Nov 27	11,300	+500
13	Oct 24	8,800	Oct 24	9,800	+1,000
27	Oct 4	8,200	Sept 30	10,100	+1,900
29	Oct 4	7,400	Oct 4	10,900	+3,500
34	Oct 4	4,800	Sept 26	7,600	+2,800
40	Oct 26	9,100	Oct 16	10,100	+1,000
46	Oct 18	8,800	Oct 16	10,400	+1,600
			Average Difference		+1,750

Closure of Southwest Pass

Published-discharge condition

47. A dike was placed across Southwest Pass, completely closing it off from the Gulf of Mexico. A salinity test was then conducted that was identical with the base test in all respects except for the closure of the pass. Published hydrographs were used at all weirs. The times of HW slack were changed by the closure of the pass, and a corresponding change was made in the time of sampling. The effects of the closure upon salinity are shown in table 5 and plate 58. High and low salinities are shown in plates 63 and 64. The salinity in Vermilion Bay was reduced by about two-thirds and the period of maximum salinity was retarded by about 85 days so that, with the pass closed, maximum salinity would occur after the rice irrigation season is over. Salinities at stations 27 and 29 in the Marone Point cross section, which represented the source salinity for West Cote

* In this report, "published" discharge refers to historic Atchafalaya River discharges measured and recorded by either USGS or the Corps of Engineers; "routed" discharge refers to flows routed through the Old River Control Structure, as computed by the Office of the President, Mississippi River Commission.

Changes in Times of HW Slack at Major Sampling Stations

Station	Time of HW Slack (Hours after Passage of Moon over Eugene Island)	
	With Southwest Pass Open	With Southwest Pass Closed
3	6.0	8.5
5	5.0	7.0
13	6.5	7.5
27	6.0	7.5
29	6.5	7.5
34	7.0	8.5
40	7.0	7.5
46	7.0	7.5

Blanche and Vermilion Bays when the pass was closed, remained nearly the same as those of the base test. The typical relation between the base-test and closure-test salinities in West Cote Blanche and Vermilion Bays is shown in the following tabulation:

Effect of Closure of Southwest Pass on Peak 1954 Salinities, Published Discharge

Station	Date of Peak Salinity		Peak Salinity, ppm		
	Base Test	Closure	Base Test	Closure	Difference
3	Oct 19	Jan 9	10,400	3,800	-6,600
5	Oct 25	Jan 9	10,800	3,800	-7,000
13	Oct 24	Jan 9	8,800	3,600	-5,200
34	Oct 4	Oct 2	4,700	4,500	-200
40	Oct 26	Dec 11	9,000	3,600	-5,400
46	Oct 18	Dec 11	8,800	3,200	-5,600

Routed-discharge condition

48. A test was next undertaken in which Southwest Pass was closed and the 1954 hydrographs for the Wax Lake Outlet and Atchafalaya River complex were reduced by being routed through the Old River Control Structure. The results of this test are shown in table 5 and plate 58. High and low salinity data are shown in plates 65 through 68. In the following table, salinities are compared at stations 3, 5, 13, 34, 40, and 46 for the published discharge, pass closed, the routed discharge, pass open, and the routed discharge, pass closed, in order to show: (a) the effect of closing the pass against the background of the open pass for the same discharge condition, and (b) the effect of the Old River Control Structure upon salinities in the bays with the pass closed.

Effects of Old River Control Structure and Closure of Southwest Pass on 1954 Peak Salinities

	Date of Peak Salinity			Peak Salinity, ppm		
Station	Published Discharge Pass Closed	Base Test Routed Discharge	Routed Discharge Pass Closed	Published Discharge Pass Closed	Base Test Routed Discharge	Routed Discharge Pass Closed
3	Jan 9	Oct 10	Jan 8	3,800	12,100	4,400
5	Jan 9	Nov 27	Dec 25	3,800	11,300	4,500
13	Jan 9	Oct 24	Jan 9	3,600	9,800	4,400
34	Oct 2	Sept 26	Oct 2	4,500	7,600	4,300
40	Dec 11	Oct 16	Dec 25	3,600	10,100	4,800
46	Dec 11	Oct 16	Dec 26	3,200	10,400	4,200

49. The tabulation shows that closure of Southwest Pass caused similar shifts in the time of peak salinity in Vermilion Bay for both published and routed discharges. It also shows that salinities in Vermilion Bay were increased by approximately 1000 ppm by the reduction in discharge in Atchafalaya River and Wax Lake Outlet caused by the Old River Control Structure.

50. The salinity curves shown in plate 58 indicate that if a lag occurred in the intrusion of saline waters into Vermilion Bay because of the closure of Southwest Pass, a lag also occurred in the recession of the saline waters, so that at the Marone Point cross section (stations 27 and 29), the salinity recession carried over into the succeeding year. This raised the question of whether the slow recession might have a cumulative salinity effect should the second year be extremely dry. Therefore, this test was extended through 1506 cycles, or 780 days. The results of these tests are shown in table 5 and plate 58. There was no evidence at the end of the test that salinity values in Vermilion Bay were increasing because of slow recession.

Effect of closure on the tidal characteristics and hydraulics of Marone Point cross section

51. It was desired to determine the effect of the closure of Southwest Pass on the tidal range and phasing in Vermilion Bay, and the head difference that would exist between the two sides of the closure. Tidal heights for Eugene Island, Salt Point, Cypremort Point, Southwest Pass

(bay side), and Southwest Pass (ocean side) are shown in plates 69-70. The tidal range at Eugene Island was decreased by 0.05 ft (0.0005 ft model) by closing the pass, and the plane of tidal fluctuation was raised about 0.1 ft. There was no appreciable difference in the tides at Salt Point. At Cypremort Point the time of high and low water was retarded by about 2 hr. The range of the tide was reduced by 0.3 ft, high water being 0.1 ft lower for the closure than for the base condition, and low water being 0.2 ft higher.

52. The tides on opposite sides of the closure structure were 90 deg out of phase, low water in the Gulf of Mexico corresponding to high water in the bay, and high water in the Gulf of Mexico corresponding to low water in the bay. This would produce the greatest possible slope from one side of the structure to the other. For the equatorial mean tide reproduced in the model, a high water of 1.4 ft in Vermilion Bay corresponded to a low water of 0.7 ft in the Gulf of Mexico, producing a head of 0.7 ft. Should the closure be provided with a bypass canal, the slope through the canal would thus be great both at high water and at low water. A gulf high water of 1.6 ft corresponded to a bay low water of 0.82 ft, giving a head of 0.78 ft. At the inner end of Southwest Pass the phasing of the tide was retarded 3.0 hr by the closure.

53. The reduction in tidal range inside the bays was not entirely due to the loss of Southwest Pass as a source of tidal flow. The changed phasing of the tide in West Cote Blanche and Vermilion Bays effected a reduction in current velocities in the Marone Point cross section (plates 71-72). It therefore appears that there is little likelihood of scour around the east end of Marsh Island.

Effect of closure on salinity during a normal year

54. As stated earlier, the effectiveness of the closure of Southwest Pass in reducing the salinity of Vermilion Bay was studied first for the year 1954, a low-discharge year approximating the worst conditions of record with respect to water supply. When the plan proved effective under the worst conditions, the Department of Public Works desired to know what salinities to expect for a normal year. Since 1955 was considered a normal year in regard to precipitation, and since the model had already been

adjusted to that year, it was decided to test the effectiveness of the closure of Southwest Pass for the 1955 discharge condition.

55. 1955 salinity base test. Although the model had been adjusted to reproduce the 1955 condition, model samples had been obtained on the date and at the time of the prototype samples. A test of one-year duration was therefore undertaken, during which model samples were obtained at high-water slack. In this test, the discharge for the Atchafalaya River-Wax Lake complex reflected the effects of the Old River Control Structure. Salinities for this test are presented in table 7 and plate 73. Low and high salinity data are shown in plates 74 and 75.

56. 1955 closure test. Southwest Pass was then closed, and a test of one-year duration was conducted using routed discharge as in the base test. The results of the test are presented in table 7 and plate 73. Low and high salinities are shown in plates 76 and 77. The table below shows the effect of the closure of Southwest Pass for a normal year:

	Dates and Cycles of Peak Salinities						Peak Salinity, ppm		
	1954 Pass Closed		1955 Pass Open		1955 Pass Closed		1954 Pass Closed	1955 Pass Open	1955 Pass Closed
Station	Date	Cycle	Date	Cycle	Date	Cycle			
3	Jan 9	722	Nov 13	614	Feb 3	772	3,800	9,800	2,000
5	Jan 9	722	Nov 19	627	Feb 6	777	3,800	9,000	2,000
13	Jan 9	722	Nov 13	614	Feb 6	777	3,600	7,500	1,700
34	Oct 2	533	Nov 6	600	Oct 30	587	4,500	3,800	3,900
40	Dec 11	668	Nov 7	601	Nov 27	641	3,600	7,900	2,500
46	Dec 11	668	Nov 12	612	Jan 9	723	3,200	8,000	1,200

It can be seen that with Southwest Pass closed, salinity in Vermilion Bay for a normal year is about 2000 ppm less than for the 1954 low-discharge year. While the peak salinity occurred later in the year with the pass closed, no direct comparison of the two years is possible, because the shape of the discharge hydrographs for the two years was not similar. It was assumed in the model study that completion of Southwest Pass closure would be accomplished at low salinity, and it should be noted that low salinity in 1954 was about cycle 35, whereas in 1955 it was about cycle 290.

Effect of Water Withdrawals on Salinity

57. Because of anticipated future surface-water requirements in

southwest Louisiana, it was desired to determine the effect on Vermilion Bay salinity of the withdrawal of 4000 cfs west of Vermilion Lock, and 2000 cfs from each of the following streams: Vermilion River, Bayou Petite Anse, and Charenton Canal. A test of these withdrawals was made for conditions of the 1955 hydrographs routed through Old River Control Structure with Southwest Pass closed. The duration of the test was 803 cycles, or about 416 days. The results of the test are presented in table 7 and plate 73. High and low salinities are shown in plates 78-79. The closure of Southwest Pass was made on cycle 290, and withdrawal of water was begun immediately upon completion of the closure.

58. It was found that the date of peak salinity was not appreciably altered by the withdrawals. The salinity of the peak was increased by about 1800 ppm in Vermilion Bay, but the extremely low salinity peak that had characterized the mouth of Vermilion River for the normal runoff year was increased from approximately 1200 ppm to 3600 ppm by the withdrawals. The salinity at station 34 at the mouth of Charenton Canal, which had not been appreciably improved by the closure of Southwest Pass, was not appreciably worsened by the withdrawals, the peak salinity increasing from about 3900 ppm to about 4200 ppm.

59. Another pertinent aspect of the effects of the withdrawals was the reduction in the minimum salinity occurring subsequent to the closure of Southwest Pass. Undoubtedly, the cause of this reduction was the fact that the water withdrawn was replaced by fresher water from East Cote Blanche and Atchafalaya Bays. If such withdrawals were continued on a year-round basis, the question might well arise of whether the water of East Cote Blanche and Atchafalaya Bays would be sufficiently fresh at the end of winter to allow this situation to recur year after year. It is believed that the answer to this question lies in the fact that the vast discharges from the Atchafalaya River and Wax Lake Outlet would continue to freshen Atchafalaya and East Cote Blanche Bays during the winter regardless of the withdrawal of 10,000 cfs in the bay complex to the west. If this be the case, the withdrawals tested would continue to be beneficial to the salinity in Vermilion Bay during the rice irrigation season.

60. Another aspect of the situation that could not be evaluated in the model was that although the withdrawals would not adversely affect the

salinity of Vermilion Bay during the rice irrigation season, the increase in Vermilion Bay salinity that occurs late in the year would tend to make the salinity of the water withdrawn fairly high. Since this office does not know what salinity can be tolerated in the water withdrawn, the effect of this situation is not evaluated in this report.

Effect of Hurricane on Vermilion Bay Salinity

61. The fact that salinity recession from Vermilion Bay becomes very slow when Southwest Pass is closed raised the question of how long a period of time would be required for the dissipation of the effects of a hurricane tide on Vermilion Bay salinity. Accordingly, the hurricane tide of September 1947 was reproduced in the model. This hurricane tide was superimposed upon the astronomical tide at a time corresponding to 1 July of the 1954 runoff year. In addition, the hydrographs of all tributaries to the modeled embayments were altered to reflect the runoff caused by the hurricane precipitation (table 8).

62. As stated in paragraph 8, a chenier, or dune, having a crest elevation of about 5 ft above mgl, traverses almost the entire length of the seaward side of Marsh Island. In the model, this dune acted as a barrier and prevented the hurricane surge from crossing the island. The hurricane surge was not of sufficient duration to cause the penetration of salt water through the Marone Point cross section in appreciable quantities, as can be seen in plate 80. Since there were no detectable salinity effects in Vermilion or West Cote Blanche Bays, the test was discontinued.

63. After this study was completed, Hurricane Audrey occurred (27 June 1957). While it is not known what effect this hurricane had upon salinity in Vermilion Bay, the elevation of high water at Eugene Island was 7.9 ft mlw. No doubt such a surge would have crossed Marsh Island, and would have introduced a considerable volume of sea water through the Marone Point section and through Southwest Pass by translation. The hurricane conditions simulated in the model study were not severe enough to indicate the results of such a situation.

PART VI: DISCUSSION OF RESULTS AND CONCLUSIONS

Results

Effect of closing Southwest Pass on peak salinities

64. For the low-discharge year tested (1954), the closure of Southwest Pass caused an average reduction of 5000 ppm in peak salinity in Vermilion and West Cote Blanche Bays for the published-discharge condition. For the routed-discharge condition, comparison of the base test with the closure test showed that the closure of Southwest Pass caused an average reduction in salinity of 5800 ppm in Vermilion and West Cote Blanche Bays. Comparison of the peak salinities that actually occurred (base test with published discharge) with those of the closure test and routed discharge, which is really a comparison of a dry year under the existing conditions with a dry year after construction of the Old River Control Structure and closure of Southwest Pass, shows that the average decrease in peak salinity will be about 4300 ppm.

65. The year 1955, although fairly normal as regards precipitation, began with high salinities, having followed the high-salinity year 1954. For the normal year, the closure of Southwest Pass was compared only with a base condition that reflected the effects of the Old River Control Structure. Closure of the pass for this condition reduced the average peak salinities 5450 ppm below those of the base test. With Southwest Pass closed the peak salinities occurred in February of the following year. Southwest Pass was closed at the period of low salinity, and because of the relatively high discharge from Atchafalaya River and Wax Lake Outlet, which reduced salinities at stations 27 and 29 almost to zero, the salinity in Vermilion Bay continued to diminish until early September when the rice growing season was over.

66. Probably the most important effect of closing Southwest Pass, regardless of the discharge condition, was the shift in the phasing of high and low salinity with respect to the discharge hydrographs, or to the seasons of the year. The rice irrigation season in southwest Louisiana is reported to be from April through August. For the 1954 discharge condition with Southwest Pass open and routed discharge, the peak salinity in all

parts of Vermilion Bay came in October, and since low salinity in most of the bay came in June, the period June-August was one of increasing salinities. With closure of Southwest Pass, the peak salinity in the bay as a whole was shifted to January of the succeeding year, low salinity for this condition occurring in May.

Effects of Old River Control Structure

67. Results of the tests in which the discharge hydrographs contained the effects of operation of the Old River Control Structure showed that for the dry year of 1954 the average increase in peak salinities in Vermilion and West Cote Blanche Bays attributable to the decreased discharge from the Atchafalaya River and Wax Lake Outlet was 1750 ppm. The maximum increase in peak salinity was 3500 ppm at station 29; the minimum increase was at station 5, where the primary salinity response to changes in gulf currents occurs.

68. Within the interior of the bays, not only did the Old River Control Structure increase the peak salinities, but it also increased the low salinities (during the rice season) by considerable amounts. It is important to note, however, that at stations 27 and 29, both of which indicate the source salinity for Vermilion and West Cote Blanche Bays when Southwest Pass is closed, although the increase in peak salinity was great, there was no increase in low salinity. This fact is probably the key to the success of the closure plan.

Effects of water withdrawals with Southwest Pass closed

69. Apparently, withdrawals of water from streams adjacent to Vermilion Bay increase or decrease the salinity of the bay waters depending on the salinity at the Marone Point cross section. When salinity at stations 27 and 29 is low, as it was in June and July 1955, withdrawal of water from the periphery of Vermilion Bay reduces bay salinity because the withdrawals are replaced by fresher water from East Cote Blanche Bay. Conversely, if salinities at stations 27 and 29 are relatively high, as they were in November and December 1955, the result is a higher peak salinity in Vermilion Bay. The increased salinity of the bay would tend to cause contamination of aquifers outcropping in the respective basins from which withdrawals are

made. It is therefore recommended that withdrawals during winter months be made contingent upon low salinity at the Marone Point cross section.

Hurricane tides

70. The hurricane of 1947 was the worst that had passed inland near the problem area prior to the model study. Its intensity was not great compared to intensities of the worst hurricanes that have occurred in the Gulf of Mexico, such as the 1919 hurricane at Corpus Christi that caused the waters to rise to an elevation 16 ft above the predicted high water, or the 1900 hurricane at Galveston. It is reasonable to suppose that such a hurricane will one day move across the problem area.* When it does, water will be driven across Marsh Island and through the Marone Point opening into West Cote Blanche and Vermilion Bays. It is not considered necessary to design a salinity clearing system for these extremes, however, as only a few such hurricanes have occurred since 1886, and on only one occasion have they recurred at the same point (Galveston, 1900 and 1915). The usual type of gulf hurricane does not cause nearly as great a surge as the rare, very severe storms, and the results of the hurricane surge generated in the model are therefore considered fairly typical.

Conclusions

Effects of Southwest Pass closure

71. The closure of Southwest Pass would effect a considerable reduction in salinities in Vermilion Bay for all conditions of discharge. Reductions for low-discharge and normal-discharge years are given below:

	For a Low-discharge Year	For a Normal-discharge Year
Published discharge	5000 ppm	Not tested
Routed discharge	5800 ppm	5450 ppm

The time of the salinity peak would be shifted so as to occur after the rice irrigation season. Although the recession of saline waters from Vermilion Bay would be retarded by the closure of the pass, there would not be a cumulative effect from year to year.

* Hurricane Audrey, which occurred after these tests had been completed, was such a hurricane.

72. The closure of Southwest Pass would also result in a retarded phasing of tides, and a reduction in tidal range inside the bays. The changed phasing of the tide in West Cote Blanche and Vermilion Bays would effect a slight reduction in current velocities in the Marone Point cross section. Therefore, there would be little likelihood of scour around the east end of Marsh Island.

73. It was found that the closure (for conditions of a semidiurnal tide) affected the phase of the tide in such a way as to generate the maximum possible head differential on the upstream and downstream sides of the closure both at high and low water.

74. If a canal should be provided at or near the closure site, the head across the canal at high water inside the bay would be about 0.7 ft for a tide with a range of approximately 1.0 ft.

Effects of water withdrawals

75. The withdrawal of 10,000 cfs from the northern and western parts of Vermilion Bay would not affect the date of peak salinity as shifted by the closure of Southwest Pass. Peak salinities would be increased by about 2000 ppm. Low salinities would be reduced, since they occur at a time when the Marone Point cross section is low in salinity. During the low-salinity period, much more water could probably be withdrawn without damage.

Effects of hurricane tides

76. No valid conclusion can be drawn as to the effect upon salinity of the inundation of the problem area by a hurricane surge, or of the effect of the closure of the pass on the recession of such a surge. However, from the fact that the hurricane reproduced in the model study was one of the worst of record until Hurricane Audrey occurred in 1957, and since this reproduced hurricane did not affect the salinity of the area, it appears that the occurrence of hurricanes that would affect the salinity of Vermilion Bay with Southwest Pass closed would be very rare.

Table 1

Weekly Hydrographs, 1955
Discharge in cfs

Week Ending	Atchafalaya River Morgan City	Atchafalaya River Wax Lake	Bayou Teche	Weeks Bayou, Cypremort Bayou, and Bayou Carlin	Bayou Petite Anse	Vermilion River
Jan 7	74,000	20,000	460	12	14	470
14	110,000	25,000	850	110	125	875
21	130,000	30,000	6,830	940	1,040	3,940
28	110,000	30,000	1,120	20	25	485
Feb 4	80,000	20,000	365	3	3	460
11	95,000	25,000	29,700	2,510	3,010	14,900
18	100,000	25,000	11,000	60	70	695
25	135,000	35,000	14,000	795	955	4,710
Mar 4	155,000	40,000	4,920	5	3	470
11	195,000	50,000	730	2	2	565
18	200,000	50,000	245	6	2	590
25	220,000	55,000	215	1	1	375
Apr 1	290,000	70,000	295	16	16	165
8	315,000	80,000	210	2	2	350
15	340,000	85,000	19,600	1,740	1,740	9,820
22	300,000	75,000	9,060	7	7	260
29	235,000	60,000	2,190	2	2	290
May 6	210,000	55,000	105	8	5	-95
13	185,000	45,000	60	4	2	-385
20	145,000	35,000	10,200	2,590	1,580	2,800
27	115,000	30,000	8,550	860	525	880
June 3	135,000	35,000	820	1	2	22
10	125,000	30,000	260	85	450	100
17	115,000	30,000	150	25	130	-80
24	105,000	25,000	-15	8	45	-665
July 1	100,000	25,000	805	350	1,910	555
8	85,000	20,000	125	30	55	-280
15	80,000	20,000	4,260	1,080	2,050	4,990
22	85,000	20,000	3,120	435	830	2,280
29	85,000	20,000	1,480	165	320	410
Aug 5	80,000	20,000	4,530	905	655	1,850
12	75,000	18,000	8,790	2,240	1,320	2,980
19	60,000	14,000	360	40	240	14
26	55,000	14,000	-40	40	25	-950

(Continued)

Table 1 (Concluded)

Week Ending	Atchafalaya River Morgan City	Atchafalaya River Wax Lake	Bayou Teche	Weeks Bayou, Cypremort Bayou, and Bayou Carlin	Bayou Petite Anse	Vermilion River
Sept 2	50,000	13,000	965	285	140	285
9	50,000	12,000	325	30	210	740
16	45,000	11,000	165	25	185	70
23	40,000	10,000	180	4	30	120
30	35,000	9,000	180	6	45	215
Oct 7	55,000	14,000	290	45	42	160
14	55,000	13,000	180	5	4	30
21	80,000	20,000	155	2	2	60
28	60,000	15,000	185	2	2	20
Nov 4	45,000	12,000	175	2	2	40
11	40,000	10,000	265	15	17	110
18	45,000	12,000	270	6	7	110
25	45,000	11,000	1,170	230	250	960
Dec 2	60,000	15,000	3,600	1,010	1,350	4,900
9	70,000	17,000	3,070	380	975	3,680
16	55,000	14,000	560	3	8	255
23	55,000	14,000	425	2	4	305
31	45,000	11,000	540	1	3	350

Note: Atchafalaya River and Wax Lake discharges based on Krotz Springs measurements. Other discharges estimated by USGS. Minus sign indicates withdrawal.

Table 2

1955 Salinity Verification
Salinity in ppm

Sta No.	Cycle 8 Prototype	Cycle 8 Model	Cycle 21 Prototype	Cycle 21 Model	Cycle 48 Prototype	Cycle 48 Model	Cycle 73 Prototype	Cycle 73 Model	Cycle 79 Prototype	Cycle 79 Model	Cycle 91 Prototype	Cycle 91 Model	Cycle 104 Prototype	Cycle 104 Model	Cycle 114 Prototype	Cycle 114 Model	Cycle 118 Prototype	Cycle 118 Model	Cycle 129 Prototype	Cycle 129 Model	Cycle 143 Prototype	Cycle 143 Model
3	8630	745	----	1490	7110	3380	----	3667	3650	3151	4560	2693	2920	2521	3570	2292			3440	2120	1480	1833
29	5450	229	6910	917	3540	1260	2500	917	1920	1031	3690	917	2850	687	----	687	1980	----	662	573	88	401
40	8230	229	9220	1203	7300	2349	5670	2635	5870	2578	3790	1948	3120	3094	3620	1547	3620	----	2400	1318	2020	859
54	----	----	----	----	----	----	----	----	----	----	742	687	----	745	----	401			----	286	25	229
	Cycle 158		Cycle 172		Cycle 184		Cycle 214		Cycle 226		Cycle 228		Cycle 240		Cycle 251		Cycle 267		Cycle 280		Cycle 292	
1	2200	1203	2200	917	2080	1031	1170	401	1280	401			1140	573	1290	458	1230	229	1120	229	1130	229
2	2350	1547	2210	2000	2120	1260	1380	1031			1320	802	1130	802	1050	859			920	630	1010	573
3	1380	2234	1410	2292	1400	1719	----	974			900	1203	1310	802	510	745	----	745	64	573	840	917
4	1920	2177	3340	1948	1070	1604	179	1260	910	859			455	802	262	745	1130	573	560	917	940	917
5	4110	2177	4590	1318	1800	1547	1190	974	1770	745			660	745	2510	802	3990	687	730	687	1620	802
6	4810	1604	4310	2062	2600	1031	1070	630	1900	802			640	630	3150	630	4090	630	780	802	1180	917
7	3890	1891	3670	1661	2750	1089	940	859	1690	859			620	687	2620	859	4340	630	940	344	2210	974
8															3520	802			1260	1146	2620	1260
9															3540	859			1350	1203	3220	1375
10															4460	859			1630	1375	3640	1260
11	2180	1661	2120	1547	2150	1432	650	745	1410	630			960	687	1420	573	1420	516	1340	458	900	344
12	2350	1089	2020	1146	2140	859	950	573	1230	458			860	573	1120	573	1430	458	1320	401	1020	344
13	2520	1089	1840	859	1840	745	438	573	452	458			1020	458	1550	401	1310	286	455	401	472	286
14	2500	1490	2320	1375	2200	1031	1890	630	830	573			1220	573	1540	516	1300	516	1070	401	320	344
15	1480	1547	2470	1776	2650	1375	1910	573	1740	917			1530	573	1590	687	1310	516	730	516	545	458
16	2010	1776	2600	1432	2350	1375	2030	859	1230	745			1250	1031	1530	573	1180	802	920	458	650	573
17	2520	1432	3280	1661	2600	1547	1570	630	910	859			670	687	1030	630	1830	458	720	401	780	344
18	2200	1318	3280	1776	3000	1203	870	573	1740	859			620	573	1030	802	2390	516	720	573	790	516
19	2620	974	3770	1146	2600	630	880	458	1930	859			545	344	2970	573	4200	458	960	917	1270	859
20	2130	859	3470	745	558	516	280	229	1210	687			528	229	2410	286	1810	401	650	229	435	344
21	1170	859	1720	745	545	401	292	229	295	286			171	286	382	229	278	229	197	229	620	286
22	1160	630	1450	516	592	458	308	229	298	286	290	229	260	172	126	172	178	229	200	172	580	229
23	1080	859	850	458	410	458	320	286			72	286	148	229	118	172			49	286	360	115
24	1070	802	615	687	472	573	405	----			285	286	138	229	121	115			77	229	288	172
25	715	573	595	458	398	401	235	229			165	344	117	229	118	172			102	229	171	172
26	542	458	608	344	405	286					147	229	111	172	128	172			125	172	104	115
27	173	344	149	286	114	286	61	115			29	229	65	172	58	172			37	458	162	172
28	40	344	116	286	34	286					110	229	60	115	48	172			35	344	44	172
29	86	401	46	286	32	344	75	229			63	286	78	172	45	172	----	286	38	229	56	115
30	405	458	230	286	38	172	111	172			65	172	45	115	46	115			45	115	52	172
31	308	344	330	344	205	229	19	172			36	229	77	115	61	115			84	115	72	115
32	415	458	275	344	330	401	19	229			28	172	37	115	50	115			61	229	36	172
33	552	229	205	401	452	344	14	172			31	172	37	229	68	172			79	115	53	115
34	252	229	61	344	69	344	13	229			25	115	36	172	112	229			30	172	54	115
35	290	401	980	286	540	344	97	229	158	229			112	172	45	172			120	172	89	115
36	1500	1318	950	1089	1030	458	470	229	137	286			147	172	154	172			95	172	70	344
37	800	1719	2240	1375	1320	1318	285	573	690	573			900	573	437	573	402	516	70	344	452	286
38	1660	1661	2200	1260	1020	1031	225	573	465	458			272	573	140	630	117	344	77	344	810	344
39	1540	1719	1880	1490	632	1375	185	573	175	516			125	630	126	516	78	516	87	286	1010	401
40	1590	1375	1530	1146	390	974	70	516	200	573			62	516	109	516	96	516			1030	286
41	1310	974	1500	802	241	859	88	401	157	286	74	458	83	229	112	229	122	516	74	286	960	344
42	1760	1604	2260	1318	1660	1318	800	573	1180	630			990	458	183	458	590	688	50	344	660	344
43	2080	1318	2170	1375	1690	1203	860	745	1120	573			1300	687	1170	573	920	401	760	401	620	344
44	2330	1776	2220	1719	1710	1719	1400	917			1320	573	1120	458	1100	630			930	229	990	344
45	2475	2005	2170	1661	1940	1375	1280	630			1280	573	1000	630	1110	573			1020	344	1070	344
46	2200	1260	2320	859	2260	1146	1870	516	1290	229			1580	516	730	516	1250	344	1150	401	392	344
49	1930	----	2050	----	1960	----	920	----			970	----	1100	----	108	172			40	286	66	115
50	1550	----	1970	----	2040	----	515	----			910	----	1040	----	53	172			33	286	72	115

(Continued)

Table 2 (Continued)

Sta No.	Cycle 158 Prototype	Cycle 158 Model	Cycle 172 Prototype	Cycle 172 Model	Cycle 184 Prototype	Cycle 184 Model	Cycle 214 Prototype	Cycle 214 Model	Cycle 226 Prototype	Cycle 226 Model	Cycle 228 Prototype	Cycle 228 Model	Cycle 240 Prototype	Cycle 240 Model	Cycle 251 Prototype	Cycle 251 Model	Cycle 267 Prototype	Cycle 267 Model	Cycle 280 Prototype	Cycle 280 Model	Cycle 292 Prototype	Cycle 292 Model
52															28	115			30	229	48	172
53															28	172			36	115	37	115
54	----	115	----	172	----	115	----	115	----	115			----	115	32	115	----	172	32	115	36	115
55															38	115			35	344	46	115

Sta No.	Cycle 309 Prototype	Cycle 309 Model	Cycle 330 Prototype	Cycle 330 Model	Cycle 346 Prototype	Cycle 346 Model	Cycle 365 Prototype	Cycle 365 Model	Cycle 441 Prototype	Cycle 441 Model	Cycle 466 Prototype	Cycle 466 Model	Cycle 487 Prototype	Cycle 487 Model	Cycle 506 Prototype	Cycle 506 Model	Cycle 528 Prototype	Cycle 528 Model	Cycle 553 Prototype	Cycle 553 Model	Cycle 582 Prototype	Cycle 582 Model
1	890	286	1220	458	1910	401	2340	458	980	688	2220	802	2800	1203	2920	1719	2700	2463	3050	3266	5530	3838
2	890	630	1510	573	1930	687	2020	1146	1240	1203	3050	1375	3990	2292	3220	2693	3120	3437	3340	4297	8430	5213
3			1890	1432	1960	1661			1910	2578	2850	3094	3840	3266	3440	3781	3070	4927	3520	4984	5670	5729
4	1,600	1719	3490	2292	1880	2922	1260	4239	2780	2349	3200	4010	4070	4755	3570	5500	3740	5729	4160	5099	5820	5672
5	2,700	2292	4410	2177	6240	2750	1260	3667	4240	3323	6190	3838	5580	2693	3920	4297	3940	5156	5100	5500	6710	5042
6	2,800	1203	4540	1490	5100	1833	1260	2865	4560	2349	6190	3266	6120	3896	3970	4583	3890	4354	4980	5812	7500	4927
7	4,340	1719	4140	2177	5700	2521	1280	4755	3270	3151	6640	2865	7160	4526	4510	4927	3940	6760	5230	5729	7500	5787
8	5,200	1146	4240	3266	7250	3781	1360	5042	5230	3380	6640	5099	6660	4354	4190	5213	4390	6989	5620	6646	7200	5844
9	6,220	2693	5920	3094	7550	3896	1300	4870	5950	3266	7550	5042	7650	5786	4810	5901	5300	6646	7110	5557	8680	5958
10	13,400	2865	6040	3437	8730	4010	1270	5271	8280	3724	8090	5213	8770	6187	6040	6875	5750	7276	7400	6588	9270	6474
11	690	516	1220	745	2010	1089	2070	1318	1060	1604	2750	2062	2750	2578	2780	2693	3420	3896	2980	4526	4760	4182
12	580	458	800	458	2360	802	1890	802	790	1203	2100	1604	3000	2177	2420	2463	2670	3094	2820	4010	4190	3953
13	495	458	600	344	1890	458	2300	687	56	1260	2290	1203	2550	2120	2150	2349	2050	2750	2580	3552	4610	3838
14	428	573	600	458	2040	573	2280	1031	49	1203	3440	1661	2450	2292	2580	2578	2720	3323				
15	720	630	1080	802	2570	1089	2170	1432	662	1432	4560	1948	2320	2005	3390	2807	3200	3781	2600	3896	5500	4182
16	940	745	1630	630	2190	1260	1620	1490	1010	1776	5720	1833	2800	2406	3990	3036	3940	3724	4290	4354	6810	4812
17	1,960	1260	2870	1490	5230	2005	1260	2807	2600	1547	6190	3552	3790	2863	3840	4755	3720	5213	4490	3838	7890	4182
18	4,540	1432	3740	1318	6710	2234	1260	3151	3420	1604	5530	----	4880	3094	3820	4755	3820	4583	4660	4469	7850	4526
19	5,770	1547	3890	2578	4340	2635	1290	3838	3520	2005	6000	4354	5580	5271	3770	6015	3870	5958	4440	4526	6220	4583
20	2,670	1203	3920	573	3990	2578	1260	1661	3220	1547	5450	2349	4810	2979	3990	3552	4020	4182	4290	4111	6090	4125
21	860	115	1830	344	1280	344	890	573	2220	2120	3000	1318	3270	1661	4040	2177	3620	3323	3740	4182	5130	3323
22	338	115	1610	286	1210	172	730	286	2090	974	2780		3080	1833	4310	2865	3770	2635	3570	3437	4740	3437
23	232	573	580	172	512	172			2260	573	2500	802	3390	1375	3370	2177	3990	3208	3440	2578	4360	3036
24	183	172	232	115	548	172			2400	401	2780	630	3390	1203	4460	1375	3970	2521				
25	183	172	215	229	320	172			1940	344	3590	573	3790	516	3790	974	4210	1833	3640	2292	5100	2292
26	415	115	378	172	335	172	530	172	1820	286	5600	573	4440	859	3890	1318	4490	2463				
27	860	115	242	172	385	115	212	286	970	344	5650		4610	1148	3820	2005	4020	2979	3970	3094	5330	1833
28	780	115	152	172	224	172	68	172	1200	229	5030	401	3740	1089	3000	1833	3340	2635				
29	480	115	81	286	179	344	58	229	1430	286	1660	401	3000	745	2650	1203	2480	2349	1980	2463	3470	1948
30	128	115	80	115	132	115	65	344	740	286	1070	401	1840	745	2120	1432	2260	2234				
31	61	172	84	172	89	115	102	172	362	344	970	344	1670	630	1960	1318	2170	2635	1990	2463	2040	1891
32	56	115	87	115	93	115	104	115	50	286	1040		1520	687	2100	1089	2400	2005	2010	2349	1460	2062
33	60	115	92	115	97	172	111	115	99	229	800	344	1510	630	1800	589	2480	1776				
34	78	286	125	172	54	172	132	172	71	86	930	115	1130	229	1710	286	2420	687	1560	1891	1380	2234
35	120	115	155	172	312	172	150	172	735	286	1670	344	1550	516	2270	859	2620	1260	2180	2463	2650	2234
36	227	115	506	172	750	172	295	229	1840	286	1860	401	2600	688	2380	1669	2900	1490	2980	2406	2900	2521
37	850	401	1870	401	1930	573	332	573	1820	1203	1950	1490	3270	2177	2950	2463	3050	2979	3420	4125	4410	4526
38	700	401	1680	516	1900	630	232	630	1930	1318	2150	1661	3420	1547	2680	2865	3420	3151				
39	550	401	1720	516	1800	630	228	687	1940	1432	2050	1948	3470	2005	2420	3323	3470	3609				
40	425	401	1690	516	1640	573	480	687	1970	1089	2030	1719	3440	1089	2680	2635	3520	3725	3300	3896	4490	4182
41	560	229	1600	516	1540	573	502	573	1960	1203	2180		3250	1891	4040	2578	3720	3437				
42	478	458	880	458	1440	630			1940	1031	1940	2005	3150	2578	3000	2979	3970	2979				
43	930	401	2090	401	1820	516	1210	859	1710	1146	3050	1089	3920	2349	3540	2807	3370	2406	3340	3609	4340	4640
44	880	401	1950	516	1720	458	1990	859	1590	974	3050	1432	3720	1604	3270	2463	3320	3609	3370	3953	4740	4411
45	940	286	1460	458	2090	573	1760	573	1190	1146	3300	1203	3370	1719	3200	2521	3370	3667	3120	3896	5620	4411
46	398	458	191	401	1330	573	1430	687	182	1031	1940	1776	840	2005	2040	2750	1810	2463	1970	4182	5330	4010
49	71	172	85	172	95	115	52	172	485		2390	344	1880	573	2290	974	2200	1891	2050	2292	2350	2005
50	73	229	101	115	115	115	84	115	258	229	3520	344	2140	516	2140	859	2330	1891	2320		1980	2234
52	55	115	70	115	36	286	73	172	68	229	328	229	2920	344	1640	802	1280	1891	2780	2234	1040	2234
53	49	115	73	172	105	286	61	172	220	114	1980	229	3390	401	1830	1089	2190	1948	3150	2177	1450	1776
54	302	115	83	172	169	115	58	344	495	458	3340	286	3370	630	2070	1490	1930		3440	2779	2180	1719
55	508	115	156	172	145	286	58	172	1130	286	4360	401	3570	802	2520	1432	2600	2578	3620	2750	3420	1776
56									43	57	73	115	1320	57	2170	172	1100	172				

(Continued)

Table 2 (Continued)

Sta No.	Cycle 309		Cycle 330		Cycle 346		Cycle 365		Cycle 441		Cycle 466		Cycle 487		Cycle 506		Cycle 528		Cycle 553		Cycle 582	
	Prototype	Model	Prototype	Model	Prototype	Model	Prototype	Model	Prototype	Model	Prototype	Model	Prototype	Model	Prototype	Model	Prototype	Model	Prototype	Model	Prototype	Model
57									43	57	101	57	790	57	850	115	468	115	1950	115	175	172
58									47	57	92	115	270	57	82	115	115	57				
59									47	57	81	86	310	57	94	115	84	57	198	115	180	57
60									49	86	82	57	1180	57	740	57	165	57				
61									62	57	212	115	740	57	455	86	282	57	1360	115	135	57
62									51	57	278	57	61	57	590	57	145	57				
63									47	57	75	57	60	57	168	86	230	57	375	57	178	57
64									51	57	69	57	57	57	165	57	165	57				
65									49	114	82	57	60	57	121	57	84	57	62	57	182	115
66									50	114	83	57	101	57	106	115	282	57	94	57	185	57
67									50	57	137	57	175	57	172	57	248	57				
68									50	114	124	57	57	57	200	57	300	57	920	115	180	57
69									56	57	1280	115	1730	57	1010	57	3570	57	2700	229	1350	57
70									52	57	530	57	680	57	340	57	1202	57	1820	172	790	57
71									130	57	628	57	840	57	278	57	1020	57	2550	57	650	57
72									52	57	860	115	1020	115	495	57	1640	57	1770	57	1650	57
73									48	114	1430	115	1930	57	618	57	1090	57				
74									63	57	2450	57	2550	57	1470	57	1650	57	1660	57	1780	57
75									45	57	1190	57	2420	57	1500	57	1940	57				
76									46	57	362	57	2350	57	870	57	2220	57	2650	57	990	57

Sta No.	Cycle 616		Cycle 659	
	Prototype	Model	Prototype	Model
1	5200	4068	4210	1833
2	4360	5156	3720	4411
3	5600	5672	3120	4640
4	5430	5500	3370	4698
5	6760	6245	4740	4755
6	6860	5213	4510	4755
7	7250	5557	4860	4812
8	7060	5901	4960	4927
9	7500	6015	5750	5156
10	7650	5786	6190	5042
11	4590	4812	3690	4239
12	2750	3953	1820	4125
13	2040	4469	450	1719
15	6460	4411	575	2979
16	5950	4927	4540	4812
17	6410	4755	4830	3838
18	6760	5042	4830	4297
19	6610	4354	4760	4526

Sta No.	Cycle 616		Cycle 659	
	Prototype	Model	Prototype	Model
20	5500	4182	3440	4583
21	5130	4297	3250	4870
22	5050	3609	3220	3667
23	4760	3667	2800	2521
25	4210	2406	2420	2635
27	4760	2005	2700	2292
29	4310	2120	2100	2406
31	3540	2120	2190	2177
32	3670	2005	1140	2062
34	2880	1948	452	573
35	1120	2062	1170	2292
36	1580	2521	2620	1661
37	3300	4812	4610	4297
40	4830	4411	3590	4182
43	2850	4583	4090	3437
45	5820	4411	4260	3266
46	4460	4526	178	458
49	3270	1948	1590	2120

Sta No.	Cycle 616		Cycle 659	
	Prototype	Model	Prototype	Model
50	2310	1833	1310	2120
52	505	1833	245	573
53	1990	2005	2900	1089
54	3870	1891	1860	2120
55	4510	1891	2750	2120
57	112	57	115	172
59	142	172	472	115
61	107	57	260	115
63	103	57	65	115
65	104	115	64	229
66	102	57	64	115
68	350	57	68	115
69	1640	115	76	115
70	282	57	212	115
71	462	57	405	115
72	350	57	178	115
74	155	57	850	115
76	110	57	920	115

Table 3

Weekly Hydrographs, 1954
Discharge in cfs

Week Ending	Atchafalaya River Morgan City	Atchafalaya River Wax Lake	Bayou Teche	Weeks Bayou, Cypremort Bayou, and Bayou Carlin	Bayou Petite Anse	Vermilion River
Jan 8	41,400	10,300	2,160	490	435	1,710
15	41,800	10,500	4,280	1,010	900	3,150
22	51,500	12,900	1,690	100	89	560
29	106,000	26,400	700	7	6	385
Feb 5	155,000	38,600	646	36	380	475
12	127,000	31,800	342	0	0	330
19	70,200	17,500	310	0	0	310
26	64,400	16,000	364	0	0	340
Mar 5	88,800	22,200	231	0	0	320
12	84,800	21,200	226	0	0	340
19	87,200	21,800	176	0	0	310
26	83,200	20,800	183	0	0	250
Apr 2	76,400	19,100	675	63	8	530
9	83,200	20,800	319	14	18	700
16	86,200	21,500	138	1,100	1,470	100
23	95,300	23,800	303	220	295	40
30	105,000	26,200	0.2	235	310	-120
May 7	141,000	35,200	1,050	0	0	260
14	174,000	43,400	976	0	0	240
21	182,000	45,600	609	0	0	-160
28	164,000	41,000	120	0	0	-385
June 4	129,000	32,400	-136	0	0	-595
11	101,000	25,200	-200	0	0	-760
18	100,000	25,000	-152	0	0	-725
25	89,600	22,400	-41	0	0	-470
July 2	80,000	20,000	-229	0	0	-1,120
9	74,400	18,600	-124	100	44	-630
16	70,900	17,700	-180	6	3	-930
23	58,800	14,700	-155	56	25	-760
30	60,100	15,000	347	3,180	1,410	2,970
Aug 6	58,600	14,700	850	75	120	540
13	41,600	10,400	127	0	66	-790
20	43,800	10,700	-105	0	3	-720
27	43,400	10,800	87	0	2	-190

(Continued)

Table 3 (Concluded)

Week Ending	Atchafalaya River Morgan City	Atchafalaya River Wax Lake	Bayou Teche	Weeks Bayou, Cypremort Bayou, and Bayou Carlin	Bayou Petite Anse	Vermilion River
Sept 3	44,700	11,200	-109	140	46	-770
10	51,100	12,800	101	175	58	-48
17	46,300	11,600	-11	310	100	-505
24	35,900	9,000	87	455	150	-165
Oct 1	36,900	9,200	102	39	79	-34
8	41,100	10,300	168	0	1	100
15	43,900	4,010	4,010	0	390	1,100
22	50,700	12,700	625	0	14	405
29	67,100	16,700	352	0	9	330
Nov 5	90,300	23,000	630	280	320	415
12	74,700	18,800	257	75	80	190
19	55,900	14,000	227	16	17	96
26	41,900	10,500	198	15	16	81
Dec 3	36,900	9,300	201	9	13	40
10	39,400	9,900	225	0	0	28
17	46,200	11,700	360	0	0	49
24	51,200	13,000	507	0	0	95
31	55,700	14,600	1,460	0	0	310

Note: Atchafalaya River and Wax Lake discharges based on Krotz Springs measurements. Other discharges estimated by USGS. Minus sign indicates withdrawal.

Table 4

1954 Salinity Verification
Salinity in ppm

Cycle	Sta 3		Sta 5		Sta 13		Sta 27		Sta 29		Sta 31		Sta 34		Sta 40		Sta 46		Sta 52	
	Prototype	Model	Prototype	Model	Prototype	Model	Prototype	Model	Prototype	Model	Prototype	Model	Prototype	Model	Prototype	Model	Prototype	Model	Prototype	Model
10		1,375		-----		-----		-----		-----		3,094		-----		859		57		-----
35	2,250	2,005	-----	-----	-----	-----	-----	-----	-----	-----	2,000	1,891	-----	-----	3,750	2,005	125	115	-----	-----
60		2,750		3,667		-----		-----		-----		1,375		-----		1,661		745		-----
100		3,437		7,793		-----		-----		-----		974		-----		2,521		1,432		-----
125		4,411		7,390		-----		-----		-----		1,203		-----		3,667		1,375		-----
143	7,000	7,047	6,250	3,552	-----	-----	-----	-----	-----	-----	3,250	1,260	-----	-----	6,500	7,906	1,840	3,036	3,500	516
197	4,000	7,333	4,200	8,537	-----	-----	-----	-----	-----	-----	1,500	1,490	-----	-----	3,250	5,672	240	458	1,550	1,203
240	-----	-----	-----	-----	3,790	1,146	-----	-----	-----	-----	-----	-----	-----	-----	2,110	4,755	-----	-----	-----	-----
242	3,720	5,901	6,660	6,073	-----	-----	1,900	1,375	630	1,547	-----	-----	495	344	-----	-----	-----	-----	-----	-----
263	-----	-----	-----	-----	-----	-----	1,020	1,146	712	1,260	-----	-----	52	859	-----	-----	-----	-----	-----	-----
265	4,040	4,182	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	400	1,260	340	57
267	-----	-----	7,700	5,099	3,120	2,005	-----	-----	-----	-----	-----	-----	-----	-----	970	2,693	-----	-----	-----	-----
305	-----	-----	1,880	2,807	3,720	7,578	-----	-----	-----	-----	-----	-----		-----	980	2,979	2,920	2,865	-----	-----
307	-----	-----	-----	-----	-----	-----	520	573	83	573	-----	-----	248	516	2,100	2,750	-----	-----	-----	-----
325	2,820	3,036	5,380	4,411	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
330	-----	-----	2,770	4,870	3,270	2,406	-----	-----	-----	-----	-----	-----	-----	-----	1,330	2,570	3,200	2,693	-----	-----
334	-----	-----	-----	-----	-----	-----	1,540	286	695	401	-----	-----	186	329	1,960	2,292	-----	-----	-----	-----
359	-----	-----	11,800	10,714	3,970	4,125	-----	-----	-----	-----	-----	-----	-----	-----	4,020	4,125	3,070	3,838	-----	-----
361	-----	-----	-----	-----	-----	-----	3,340	2,693	1,820	1,891	-----	-----	202	229	-----	-----	-----	-----	-----	-----
386	-----	-----	12,200	7,448	6,440	7,677	-----	-----	-----	-----	-----	-----	-----	-----	7,270	8,479	5,400	7,677	-----	-----
388	9,980	11,000	-----	-----	-----	-----	6,510	8,652	4,490	8,250	-----	-----	1,350	-----	-----	-----	-----	-----	-----	-----
412	8,560	9,796	-----	-----	-----	-----	4,410	6,989	2,600	6,130	-----	-----	270	3,323	8,330	9,109	-----	-----	-----	-----
414	-----	-----	9,420	6,531	5,430	7,276	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2,100	6,073	-----	-----
425	-----	-----	-----	-----	-----	-----	7,010	7,505	3,820	4,583	-----	-----	272	5,271	11,600	7,562	-----	-----	-----	-----
427	-----	-----	-----	-----	6,540	8,135	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
429	10,600	10,427	14,900	12,718	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	5,400	7,104	-----	-----
460		10,025		9,739		-----		-----		5,614		-----		-----		8,250		8,479		-----
493	-----	-----	8,430	10,656	8,920	8,021	-----	-----	-----	-----	-----	-----	-----	-----	6,510	7,906	8,090	6,531	-----	-----
495	7,500	9,166	-----	-----	-----	-----	5,230	6,588	4,610	5,786	-----	-----	3,050	6,015	-----	-----	-----	-----	-----	-----
520	7,350	9,854	-----	-----	-----	-----	6,270	7,104	4,140	6,015	-----	-----	3,340	3,838	5,770	7,906	-----	-----	-----	-----
522	-----	-----	6,370	10,656	7,850	7,104	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	8,120	7,047	-----	-----
537	6,490	8,880	-----	-----	-----	-----	7,200	7,734	5,280	6,474	-----	-----	3,270	4,297	5,670	6,302	-----	-----	-----	-----
541	-----	-----	-----	-----	7,550	7,792	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	7,890	8,193	-----	-----
574	7,010	9,568	-----	-----	-----	-----	4,690	6,588	4,640	6,187	-----	-----	3,840	4,297	6,860	8,880	-----	-----	-----	-----
576	-----	-----	6,710	9,510	6,460	6,588	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	6,070	6,015	-----	-----
614	-----	-----	6,020	8,594	5,850	6,474	-----	-----	-----	-----	-----	-----	-----	-----	6,460	8,135	4,830	4,927	-----	-----
618	6,710	8,937	-----	-----	-----	-----	4,290	5,042	3,250	3,896	-----	-----	460	4,640	-----	-----	-----	-----	-----	-----
630	-----	-----	7,650	9,854	8,380	8,193	-----	-----	-----	-----	-----	-----	-----	-----	9,600	9,166	4,090	5,729	-----	-----
632	9,270	10,885	-----	-----	-----	-----	6,640	4,927	6,410	6,416	-----	-----	1,670	3,437	10,600	9,739	-----	-----	-----	-----
671	-----	-----	12,600	10,256	9,420	8,193	-----	-----	-----	-----	-----	-----	-----	-----	9,600	8,594	8,970	7,104	-----	-----
674	9,650	9,568	-----	-----	-----	-----	7,890	5,271	6,710	4,984	-----	-----	880	4,182	-----	-----	-----	-----	-----	-----
682	9,120	9,739	12,300	8,937	6,710	7,677	8,280	5,786	6,710	4,755	-----	-----	139	2,521	10,200	8,537	6,490	7,505	-----	-----

Table 5

Salinity Tests, 1954 Hydrographs
Salinity in ppm

	Station									
Condition	1	3	5	13	27	29	34	40	46	52
Cycles 47-48										
Base test, published discharge	400	2,875	2,900	900	2,800	1,825	3,400	1,700	225	570
Base test, routed discharge	573	2,807	1,833	687	4,354	2,979	2,120	3,151	115	2,406
SW Pass closure, published discharge	745	1,833	3,437	1,604	2,635	2,062	344	2,406	115	745
SW Pass closure, routed discharge	1,490	2,406	2,578	2,349	4,068	3,323	1,089	2,979	286	2,750
Cycles 74-75										
Base test, published discharge	1,575	3,600	4,275	2,100	1,275	1,180	680	2,100	1,400	115
Base test, routed discharge	1,661	4,010	3,495	2,693	2,693	1,833	1,089	3,266	2,234	172
SW Pass closure, published discharge	1,719	1,891	2,693	1,719	1,833	1,146	401	2,120	974	172
SW Pass closure, routed discharge	1,719	2,179	2,292	2,292	2,865	2,521	1,146	2,578	1,719	687
Cycles 101-102										
Base test, published discharge	2,075	3,600	4,600	2,300	1,025	880	675	2,200	1,675	200
Base test, routed discharge	2,521	5,271	4,640	2,979	2,635	2,005	1,260	3,495	2,292	1,490
SW Pass closure, published discharge	2,120	2,005	2,635	1,948	1,661	1,375	516	2,177	573	630
SW Pass closure, routed discharge	1,891	2,521	2,750	2,292	2,349	1,891	1,490	2,865	1,146	1,719
Cycles 128-129										
Base test, published discharge	2,670	4,425	6,050	3,000	1,950	1,600	800	3,300	1,800	500
Base test, routed discharge	3,094	6,015	3,552	2,463	3,609	3,151	1,661	4,411	1,318	1,719
SW Pass closure, published discharge	1,948	2,062	2,922	2,062	1,432	1,375	802	2,234	286	344
SW Pass closure, routed discharge	2,062	2,693	2,234	2,349	2,635	2,062	1,260	2,521	401	1,948
Cycles 155-156										
Base test, published discharge	4,075	5,050	6,125	4,300	2,020	1,950	1,050	4,200	3,725	860
Base test, routed discharge	4,068	6,875	3,896	3,838	3,208	3,094	2,120	4,812	4,182	2,292
SW Pass closure, published discharge	2,062	2,062	2,521	2,062	1,375	1,203	745	2,177	1,318	344
SW Pass closure, routed discharge	2,120	2,463	2,292	2,349	2,693	2,292	1,260	2,406	1,661	1,776
Cycles 182-183										
Base test, published discharge	4,525	6,400	5,750	4,650	1,900	1,725	600	4,550	3,825	1,215
Base test, routed discharge	4,525	7,161	6,474	4,870	2,807	2,863	1,260	4,927	4,870	2,120
SW Pass closure, published discharge	2,005	2,120	2,463	2,005	1,203	1,031	516	2,120	1,146	573
SW Pass closure, routed discharge	2,349	2,578	2,463	2,406	2,234	2,062	859	2,406	1,318	1,891
Cycles 209-210										
Base test, published discharge	3,200	5,600	4,300	2,525	1,850	1,500	1,100	4,100	375	775
Base test, routed discharge	6,818	6,760	5,614	1,547	2,463	2,406	1,146	4,354	1,604	917
SW Pass closure, published discharge	1,432	2,120	2,177	1,948	1,318	1,260	630	1,948	458	458
SW Pass closure, routed discharge	1,203	2,635	2,062	974	1,948	1,833	859	2,062	172	1,891
Cycles 236-237										
Base test, published discharge	3,240	4,980	3,600	2,400	1,550	1,300	820	3,475	750	175
Base test, routed discharge	3,208	6,302	5,672	1,490	2,349	2,120	802	4,526	2,120	229
SW Pass closure, published discharge	1,375	1,891	2,349	1,661	1,375	1,260	286	1,833	229	687
SW Pass closure, routed discharge	1,661	2,349	2,120	1,260	1,776	1,719	229	1,948	172	286
Cycles 263-264										
Base test, published discharge	2,700	3,750	3,600	2,475	1,125	1,200	700	2,550	1,100	90
Base test, routed discharge	2,807	4,354	4,640	2,406	1,547	1,260	344	4,068	2,807	115
SW Pass closure, published discharge	1,260	1,490	2,120	1,375	1,031	1,089	115	1,490	917	115
SW Pass closure, routed discharge	1,490	1,833	1,776	1,661	1,604	1,604	115	1,776	401	172
Cycles 277-278										
Base test, published discharge	2,700	3,275	2,925	2,525	775	700	600	2,575	2,300	115
Base test, routed discharge	3,151	4,698	3,667	3,094	974	917	458	3,266	3,266	115
SW Pass closure, published discharge	1,375	1,604	2,349	1,490	974	917	229	1,490	1,375	115
SW Pass closure, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Cycles 290-291										
Base test, published discharge	2,520	3,050	2,575	2,875	500	400	600	2,425	3,000	150
Base test, routed discharge	2,865	4,411	3,495	3,208	745	458	458	3,266	3,552	115
SW Pass closure, published discharge	1,490	1,490	1,891	1,490	802	630	229	1,490	1,490	115
SW Pass closure, routed discharge	1,719	1,891	1,776	1,833	1,375	1,089	386	1,719	1,661	172
Cycles 304-305-306-307										
Base test, published discharge	2,350	3,100	3,275	2,250	400	350	400	2,000	2,875	125
Base test, routed discharge	3,094	4,469	4,354	3,552	458	286	458	2,750	4,870	115
SW Pass closure, published discharge	1,490	1,490	-----	1,490	802	573	401	1,547	1,490	115
SW Pass closure, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

(Continued)

Table 5 (Continued)

Condition	Station 1	3	5	13	27	29	34	40	46	52
Cycles 317-318										
Base test, published discharge	2,200	3,100	3,380	2,325	400	425	350	2,125	2,700	200
Base test, routed discharge	2,521	4,411	4,469	3,380	286	573	344	3,151	3,953	115
SW Pass closure, published discharge	1,547	1,547	1,776	1,432	573	458	458	1,490	1,546	172
SW Pass closure, routed discharge	-----	1,776	1,948	1,891	917	745	458	1,719	1,661	172
Cycles 330-331										
Base test, published discharge	2,275	3,500	3,975	2,250	400	400	300	2,250	2,750	160
Base test, routed discharge	2,521	4,698	3,838	3,323	401	401	286	3,437	3,953	115
SW Pass closure, published discharge	1,604	1,604	2,521	1,490	630	458	401	1,490	1,490	229
SW Pass closure, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Cycles 344-345										
Base test, published discharge	2,250	3,700	4,175	2,350	425	300	200	2,580	2,550	115
Base test, routed discharge	2,292	4,640	3,781	2,349	458	286	286	3,036	2,463	172
SW Pass closure, published discharge	1,490	1,375	1,547	1,432	516	344	573	1,490	1,490	172
SW Pass closure, routed discharge	1,719	1,948	2,005	1,719	859	573	859	1,719	1,719	458
Cycles 360-361-362-363										
Base test, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Base test, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	1,719	1,833	1,891	1,719	687	573	802	1,547	1,661	401
Cycles 371-372										
Base test, published discharge	2,690	4,475	5,025	2,800	425	300	300	2,350	3,300	220
Base test, routed discharge	2,865	5,443	4,411	2,979	630	458	401	3,667	3,437	286
SW Pass closure, published discharge	1,490	1,490	1,490	1,375	458	401	458	1,375	1,490	172
SW Pass closure, routed discharge	1,776	1,833	1,833	1,661	745	573	802	1,719	1,719	401
Cycles 385-386										
Base test, published discharge	2,950	4,950	5,650	3,225	550	300	200	2,580	3,400	280
Base test, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Cycles 398-399-400										
Base test, published discharge	2,720	5,750	5,575	3,675	675	300	225	2,425	3,700	425
Base test, routed discharge	3,323	6,416	4,297	4,125	1,432	1,203	286	5,500	3,838	859
SW Pass closure, published discharge	1,375	1,547	1,490	1,375	516	458	172	1,490	1,318	172
SW Pass closure, routed discharge	1,661	1,661	1,719	1,604	974	859	401	1,547	1,661	687
Cycles 412-413										
Base test, published discharge	2,260	5,350	5,750	3,800	1,250	625	200	2,820	3,980	650
Base test, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Cycles 425-426-427-428-429										
Base test, published discharge	3,020	6,200	5,300	2,950	1,825	1,350	275	2,625	4,980	850
Base test, routed discharge	3,151	6,302	4,297	3,896	2,292	2,463	401	4,755	4,984	1,719
SW Pass closure, published discharge	1,031	1,776	1,948	1,490	687	687	115	1,375	1,375	688
SW Pass closure, routed discharge	1,432	1,833	1,719	1,604	1,776	1,318	344	1,604	1,661	974
Cycles 439-440										
Base test, published discharge	3,025	5,375	4,950	3,800	2,475	1,600	380	3,125	4,300	750
Base test, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Cycles 452-453										
Base test, published discharge	3,490	5,900	6,400	4,450	2,525	2,400	875	3,300	4,600	1,190
Base test, routed discharge	4,469	7,505	6,875	5,094	6,187	5,328	1,490	4,698	5,786	4,182
SW Pass closure, published discharge	1,318	1,661	1,490	1,375	1,260	1,260	344	1,260	1,432	516
SW Pass closure, routed discharge	1,547	1,719	1,719	1,547	3,552	3,036	974	1,604	1,661	1,891
Cycles 463-464-465-466										
Base test, published discharge	4,180	6,275	8,050	4,450	3,950	3,100	2,600	4,400	5,200	2,175
Base test, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

(Continued)

Table 5 (Continued)

Condition	Station									
	1	3	5	13	27	29	34	40	46	52
Cycles 479-480										
Base test, published discharge	4,850	6,525	9,425	5,150	4,875	3,600	2,000	5,000	5,500	2,700
Base test, routed discharge	5,729	9,625	7,161	6,989	7,276	7,906	4,125	7,161	6,989	7,219
SW Pass closure, published discharge	1,490	1,833	1,661	1,490	5,042	3,036	917	1,547	1,490	1,948
SW Pass closure, routed discharge	1,547	1,776	1,948	1,604	6,245	6,187	2,693	1,891	1,604	5,042
Cycles 506-507										
Base test, published discharge	6,225	9,100	8,925	6,825	6,000	5,050	2,800	6,000	5,620	3,975
Base test, routed discharge	6,932	10,941	9,968	8,594	9,052	9,739	6,875	8,364	9,052	8,937
SW Pass closure, published discharge	1,661	1,848	1,833	1,661	6,302	5,271	2,807	2,406	1,604	4,927
SW Pass closure, routed discharge	1,661	1,776	1,948	1,776	9,052	8,823	5,213	2,922	1,719	7,390
Cycles 520-521										
Base test, published discharge	7,025	9,400	9,825	7,550	6,680	6,375	3,650	7,275	7,050	5,600
Base test, routed discharge	7,505	11,000	10,885	9,052	10,083	10,312	7,448	8,823	9,166	9,854
SW Pass closure, published discharge	1,661	2,177	1,948	1,719	7,390	6,359	3,667	2,635	1,661	5,672
SW Pass closure, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Cycles 533-534										
Base test, published discharge	7,450	10,300	8,825	8,325	8,200	7,350	4,775	8,000	8,000	6,500
Base test, routed discharge	8,135	11,458	8,364	9,280	10,083	10,885	7,448	9,396	9,739	10,083
SW Pass closure, published discharge	1,776	2,349	1,948	1,948	9,052	6,932	4,469	3,094	1,833	5,328
SW Pass closure, routed discharge	1,776	2,177	2,005	1,948	11,000	10,312	6,351	3,495	1,833	9,854
Cycles 547-548										
Base test, published discharge	7,875	10,175	9,900	8,675	7,875	7,100	3,300	8,725	8,200	7,120
Base test, routed discharge	8,651	12,131	10,198	9,625	9,911	10,771	2,177	9,682	9,968	10,251
SW Pass closure, published discharge	2,005	2,406	2,863	2,177	7,620	7,448	1,031	3,266	1,776	8,021
SW Pass closure, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Cycles 560-561-562-563										
Base test, published discharge	8,190	10,425	9,500	8,800	7,025	6,780	3,700	8,675	8,800	6,675
Base test, routed discharge	8,594	11,744	9,510	9,625	9,396	10,255	4,927	10,083	10,312	8,880
SW Pass closure, published discharge	1,948	2,750	2,635	2,292	7,276	6,302	3,781	3,437	1,833	6,818
SW Pass closure, routed discharge	2,120	2,750	2,292	2,349	9,396	9,223	4,870	4,182	1,776	8,823
Cycles 574-575										
Base test, published discharge	8,500	10,100	10,800	8,775	6,475	6,000	3,900	9,125	8,050	6,200
Base test, routed discharge	8,937	11,802	9,625	9,854	8,594	9,166	6,302	9,625	9,740	8,937
SW Pass closure, published discharge	2,292	2,750	2,463	2,635	6,474	4,812	3,151	3,495	2,062	5,901
SW Pass closure, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Cycles 587-588										
Base test, published discharge	8,400	9,750	9,825	8,800	6,050	4,900	4,150	8,825	8,325	4,375
Base test, routed discharge	8,937	11,229	9,510	9,281	8,250	7,963	5,328	9,052	9,396	5,213
SW Pass closure, published discharge	2,635	2,979	2,635	2,922	4,411	3,896	3,437	3,495	2,005	4,469
SW Pass closure, routed discharge	2,578	3,094	2,635	2,750	7,791	6,875	5,443	4,469	2,062	7,333
Cycles 601-602										
Base test, published discharge	8,275	9,525	9,400	8,700	5,300	3,825	2,780	8,225	7,675	3,540
Base test, routed discharge	9,109	10,943	9,109	9,223	7,505	5,958	6,588	10,083	9,682	4,812
SW Pass closure, published discharge	2,922	2,979	2,922	2,922	3,896	3,151	3,208	3,323	2,177	4,755
SW Pass closure, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Cycles 614-615										
Base test, published discharge	8,240	9,550	8,500	8,200	4,825	3,250	3,200	8,525	7,900	4,025
Base test, routed discharge	8,995	11,114	9,510	9,396	7,161	5,156	5,614	9,281	9,682	5,156
SW Pass closure, published discharge	2,922	3,437	2,922	3,036	4,870	2,922	3,036	3,380	2,863	4,239
SW Pass closure, routed discharge	3,380	4,182	3,552	3,437	7,161	4,526	5,443	4,354	2,865	5,729
Cycles 641-642										
Base test, published discharge	8,250	9,400	9,100	8,050	3,700	3,400	3,350	7,725	6,875	3,980
Base test, routed discharge	9,052	10,656	11,343	9,281	6,015	5,385	5,443	9,166	9,682	5,385
SW Pass closure, published discharge	3,323	3,208	3,323	3,208	3,781	3,208	2,521	3,667	2,922	4,068
SW Pass closure, routed discharge	3,896	3,781	4,239	4,010	5,844	5,156	3,724	4,583	3,380	5,729
Cycles 668-669										
Base test, published discharge	7,560	8,775	8,625	7,850	4,175	3,000	2,650	7,800	7,900	3,900
Base test, routed discharge	8,765	10,427	9,797	9,567	7,161	6,646	4,927	8,078	9,338	6,187
SW Pass closure, published discharge	3,437	3,552	3,437	3,323	4,239	3,781	2,349	3,609	3,208	3,724
SW Pass closure, routed discharge	4,068	4,297	4,297	4,239	6,359	5,672	2,693	4,526	3,896	4,927

(Continued)

Table 5 (Continued)

Condition	Station 1	3	5	13	27	29	34	40	46	52
Cycles 695-696										
Base test, published discharge	7,800	9,000	8,800	8,300	4,200	3,825	1,600	8,200	8,375	3,790
Base test, routed discharge	8,708	10,427	8,995	9,223	7,677	7,161	4,125	9,052	9,223	6,818
SW Pass closure, published discharge	3,552	3,667	3,609	3,552	4,469	4,068	1,375	3,667	3,151	3,609
SW Pass closure, routed discharge	4,297	4,297	4,583	4,297	5,500	5,729	2,234	4,812	4,239	5,271
Cycles 722-723										
Base test, published discharge	4,984	8,308	7,448	5,958	3,838	-----	3,266	6,531	4,984	3,724
Base test, routed discharge	6,187	10,198	8,021	5,729	6,989	7,448	1,432	8,594	4,812	7,333
SW Pass closure, published discharge	2,922	3,838	3,896	3,552	4,297	4,469	859	3,323	1,490	3,896
SW Pass closure, routed discharge	3,151	4,411	4,469	4,469	5,614	5,958	1,432	4,297	1,318	5,500
Cycles 749-750-751-752										
Base test, published discharge	5,042	7,276	7,219	5,271	1,260	1,260	3,437	4,297	4,984	1,661
Base test, routed discharge	5,786	9,396	6,646	7,948	6,981	7,219	3,323	7,677	3,667	2,979
SW Pass closure, published discharge	3,151	3,495	3,208	3,323	3,724	3,495	1,776	3,437	2,635	2,177
SW Pass closure, routed discharge	3,495	4,239	4,010	3,781	5,901	5,328	3,266	3,896	2,578	4,068
Cycles 776-777										
Base test, published discharge	3,208	6,531	4,698	3,724	2,005	630	172	2,521	1,547	630
Base test, routed discharge	5,958	9,339	7,276	8,995	5,099	3,296	3,036	7,677	5,213	917
SW Pass closure, published discharge	3,094	3,437	3,323	3,323	3,266	2,120	1,661	3,437	2,750	172
SW Pass closure, routed discharge	3,724	4,239	4,068	3,896	4,354	3,552	516	4,125	2,865	1,375
Cycles 803-804										
Base test, published discharge	3,266	5,099	4,927	3,151	1,146	1,146	745	3,609	1,719	573
Base test, routed discharge	7,104	10,943	8,307	8,021	4,354	3,724	2,349	8,307	4,984	3,437
SW Pass closure, published discharge	3,036	3,495	3,495	3,266	2,292	1,432	1,547	3,208	2,062	917
SW Pass closure, routed discharge	3,838	4,297	4,239	3,953	3,838	2,807	1,432	4,010	1,891	2,979
Cycles 830-831										
Base test, published discharge	3,781	5,099	6,130	2,979	1,375	1,203	401	2,635	1,948	458
Base test, routed discharge	6,474	11,516	7,161	8,078	4,927	4,297	2,177	9,052	3,208	3,036
SW Pass closure, published discharge	2,865	3,208	3,208	3,094	2,349	1,948	1,260	3,266	974	1,490
SW Pass closure, routed discharge	3,552	4,125	4,125	3,896	3,380	2,750	1,661	3,838	1,260	2,463
Cycles 846-847										
Base test, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Base test, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, published discharge	2,750	2,979	3,094	2,807	2,349	1,891	1,049	3,151	2,062	1,547
SW Pass closure, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Cycles 857-858										
Base test, published discharge	3,455	4,927	6,531	3,437	2,463	1,776	745	4,239	3,781	172
Base test, routed discharge	7,791	10,771	8,135	8,594	4,870	4,010	2,693	6,989	7,333	3,266
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	3,838	3,781	3,896	3,667	2,979	2,062	1,490	3,380	2,865	1,375
Cycles 884-885										
Base test, published discharge	4,755	6,302	7,104	4,640	1,547	1,432	687	5,156	4,411	573
Base test, routed discharge	7,791	10,141	6,703	7,963	4,182	3,781	2,406	6,302	7,219	3,667
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	3,552	3,667	3,838	3,609	2,463	1,833	1,318	3,724	2,807	1,891
Cycles 911-912										
Base test, published discharge	3,781	5,786	5,729	4,010	1,432	1,260	516	4,755	2,234	687
Base test, routed discharge	5,099	8,708	4,984	5,786	3,896	3,208	1,547	6,359	1,146	2,463
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	1,948	3,208	3,208	3,036	2,807	2,292	1,089	3,266	172	2,062
Cycles 938-939										
Base test, published discharge	3,896	4,812	6,073	3,266	1,203	1,089	229	4,010	1,375	172
Base test, routed discharge	4,354	7,333	2,979	4,010	3,208	2,635	1,031	4,068	1,490	286
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	2,292	3,495	2,578	2,750	2,349	2,177	573	2,750	172	687
Cycles 965-966										
Base test, published discharge	2,865	2,750	4,010	2,292	745	745	745	2,177	1,719	57
Base test, routed discharge	3,495	5,844	3,323	3,552	1,776	1,089	458	2,693	2,578	172
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	2,062	2,234	2,234	2,292	2,005	1,948	344	2,578	1,490	115

(Continued)

Table 5 (Continued)

Condition	Station 1	3	5	13	27	29	34	40	46	52
Cycles 979-980										
Base test, published discharge	2,578	2,005	3,380	1,948	344	516	458	1,833	2,406	57
Base test, routed discharge	3,437	4,927	3,896	3,896	1,031	516	573	2,807	4,068	115
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Cycles 992-993										
Base test, published discharge	2,406	2,635	2,521	1,776	401	401	344	745	2,292	57
Base test, routed discharge	3,380	4,411	2,750	3,437	458	229	458	2,979	3,552	115
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	2,406	2,635	2,578	2,463	1,719	1,375	630	2,406	2,292	172
Cycles 1006-1007-1008-1009										
Base test, published discharge	2,120	2,292	2,349	1,604	344	344	344	917	1,948	172
Base test, routed discharge	3,208	5,099	4,927	2,865	458	401	576	2,693	4,010	115
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Cycles 1019-1020										
Base test, published discharge	2,292	2,120	2,578	1,719	286	286	458	1,031	2,292	115
Base test, routed discharge	3,151	4,239	3,495	2,635	573	344	401	3,266	4,010	172
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	2,578	2,292	2,635	2,349	1,203	859	401	2,406	2,463	286
Cycles 1032-1033										
Base test, published discharge	1,146	2,578	3,495	1,604	286	286	286	1,719	2,005	172
Base test, routed discharge	2,693	4,297	2,234	2,807	516	344	286	2,463	3,323	172
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Cycles 1046-1047										
Base test, published discharge	2,062	2,922	3,437	2,062	366	366	458	2,062	2,177	458
Base test, routed discharge	2,865	5,213	5,557	3,208	573	286	286	3,437	3,266	229
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	2,463	2,292	2,578	2,406	859	630	573	2,406	2,406	458
Cycles 1073-1074										
Base test, published discharge	2,635	4,182	5,271	2,635	366	366	286	2,865	2,578	172
Base test, routed discharge	3,667	6,531	7,161	3,552	802	516	286	4,526	4,354	401
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	2,292	2,120	2,578	2,292	859	573	630	2,062	2,292	573
Cycles 1100-1101										
Base test, published discharge	2,807	5,672	7,047	3,323	516	401	172	3,094	2,979	229
Base test, routed discharge	3,151	7,619	7,791	4,927	1,661	1,260	286	5,901	4,927	802
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	1,719	2,177	2,406	2,177	1,031	802	286	1,490	2,177	630
Cycles 1108-1109-1110-1111										
Base test, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Base test, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	630	2,177	2,635	2,120	1,661	1,146	286	1,146	1,833	802
Cycles 1127-1128										
Base test, published discharge	2,750	4,984	6,646	2,750	1,031	802	115	2,005	3,036	344
Base test, routed discharge	3,268	8,300	8,500	5,850	2,292	2,463	1,031	4,755	4,984	1,719
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	1,776	1,948	2,349	2,120	1,719	1,375	458	1,432	2,120	974
Cycles 1154-1155										
Base test, published discharge	2,807	5,156	4,640	3,380	2,005	1,891	917	3,323	3,495	630
Base test, routed discharge	4,469	8,950	9,150	6,750	6,187	5,328	2,234	4,698	5,786	4,182
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	1,948	2,234	2,062	1,833	3,323	2,349	1,089	1,833	2,234	1,033
Cycles 1181-1182										
Base test, published discharge	3,896	5,672	6,989	4,125	3,437	2,578	1,260	3,896	4,297	1,031
Base test, routed discharge	5,729	9,625	9,800	7,700	7,276	7,906	4,125	7,161	6,989	7,219
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	1,833	2,120	2,062	1,948	4,870	4,068	1,375	2,292	1,948	3,323

(Continued)

Table 5 (Continued)

Condition	Station 1	3	5	13	27	29	34	40	46	52
					Cycles 1208-1209					
Base test, published discharge	4,411	6,818	6,187	4,182	4,125	3,208	1,604	3,208	4,927	2,463
Base test, routed discharge	6,932	10,541	10,500	8,600	9,052	9,739	6,875	8,364	9,052	8,937
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	1,891	2,521	2,177	2,062	8,021	6,187	2,578	2,463	2,120	6,073
					Cycles 1222-1223					
Base test, published discharge	5,099	8,652	9,396	6,073	4,698	3,896	1,948	4,640	6,245	3,266
Base test, routed discharge	7,505	11,000	10,885	9,050	10,083	10,312	7,448	8,823	9,166	9,854
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
					Cycle 1235-1236					
Base test, published discharge	5,213	8,364	9,510	5,844	6,302	4,469	2,062	6,073	5,786	4,125
Base test, routed discharge	8,135	11,458	8,364	9,280	10,771	10,885	7,448	9,396	9,739	10,083
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	1,948	2,635	2,349	2,177	6,416	5,213	2,693	2,922	2,234	3,724
					Cycles 1249-1250					
Base test, published discharge	6,416	8,651	10,369	6,130	6,187	5,500	1,719	7,276	6,531	4,698
Base test, routed discharge	8,651	12,031	10,198	9,625	10,198	10,771	2,234	9,682	9,968	10,251
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
					Cycles 1262-1263-1264-1265					
Base test, published discharge	7,104	9,739	8,937	7,161	6,302	5,729	2,635	7,333	7,104	4,698
Base test, routed discharge	8,594	11,774	9,510	9,625	10,427	10,255	5,385	10,083	10,312	8,880
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	2,177	2,578	2,578	2,521	5,328	4,870	1,719	2,922	2,062	4,755
					Cycles 1276-1277					
Base test, published discharge	7,310	8,995	9,223	6,989	5,271	5,156	3,609	7,505	6,818	5,156
Base test, routed discharge	8,937	11,802	9,625	9,854	8,937	9,467	6,302	9,625	9,740	9,166
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
					Cycles 1289-1290					
Base test, published discharge	7,276	8,193	9,453	6,875	4,870	4,469	3,208	7,734	6,703	2,807
Base test, routed discharge	8,937	11,229	10,198	9,281	8,823	9,166	5,901	9,337	9,396	6,989
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	2,578	2,635	2,693	2,635	4,526	3,838	2,463	3,036	2,349	2,635
					Cycles 1303-1304					
Base test, published discharge	6,245	7,906	8,651	6,932	4,469	3,495	3,036	7,448	6,760	3,266
Base test, routed discharge	9,109	10,943	9,109	9,223	7,505	5,958	6,588	10,083	9,682	5,443
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
					Cycles 1316-1317					
Base test, published discharge	7,219	7,849	8,193	6,989	3,781	2,979	3,208	7,104	6,760	3,609
Base test, routed discharge	8,995	11,114	9,625	9,396	7,276	6,187	5,614	9,281	9,682	5,156
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	2,750	2,807	2,865	2,807	3,781	2,807	2,521	3,208	2,349	3,495
					Cycles 1343-1344					
Base test, published discharge	7,161	7,448	9,625	6,875	3,609	3,094	2,865	7,276	6,703	3,437
Base test, routed discharge	9,052	11,458	11,343	9,281	6,703	6,474	5,443	9,510	9,682	6,646
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	2,922	3,208	2,979	2,922	4,354	3,781	2,406	3,036	2,635	3,552
					Cycle 1370-1371					
Base test, published discharge	7,448	8,823	9,739	7,562	4,297	4,239	2,521	7,161	7,390	3,609
Base test, routed discharge	9,052	10,885	9,797	9,567	7,791	7,791	4,927	9,166	9,510	6,989
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	2,979	3,208	3,036	3,036	5,271	4,583	2,635	3,323	2,922	3,953
					Cycles 1397-1398					
Base test, published discharge	7,734	9,396	9,567	7,219	5,385	5,156	2,292	7,620	7,047	4,354
Base test, routed discharge	8,937	11,171	9,510	9,396	8,708	8,937	4,526	9,567	9,281	8,135
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	3,036	3,151	3,151	3,208	5,557	5,042	1,776	3,495	2,807	4,411

(Continued)

Table 5 (Continued)

Condition	Station 1	3	5	13	27	29	34	40	46	52
Cycles 1424-1425										
Base test, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Base test, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	2,406	3,208	3,151	3,380	5,786	5,614	802	3,380	917	5,729
Cycles 1451-1452										
Base test, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Base test, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	2,750	3,036	3,151	3,151	5,443	5,443	974	3,151	2,005	3,380
Cycles 1478-1479-1480-1481										
Base test, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Base test, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	2,979	3,380	3,266	3,323	4,698	3,437	1,776	3,781	2,234	1,089
Cycles 1505-1506										
Base test, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Base test, routed discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, published discharge	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SW Pass closure, routed discharge	2,979	3,323	3,151	3,266	3,838	3,609	917	3,495	1,547	2,635

Table 6

Low and High Salinity Measurements in Base Tests and Closure Test, First and Second Years
Salinity in ppm

Station	Base Test 1954 Published Discharge	1954 Routed Discharge	Closure Test, 1954 Published Discharge	Closure Test, 1954 Routed Discharge	Station	Base Test 1954 Published Discharge	1954 Routed Discharge	Closure Test, 1954 Published Discharge	Closure Test, 1954 Routed Discharge
	Low Salinity, First Year*					High Salinity, First Year**			
1		3,094	1,490	1,719	1		8,594	1,948	3,495
2		3,667	1,604	1,776	2		11,000	2,693	3,896
3		4,469	1,490	1,833	3		11,744	2,750	4,239
4		6,130	1,490	1,833	4		13,062	2,521	4,068
5		4,354	7,562	11,573	5		9,510	13,520	-----
5X		-----	-----	1,891	5X		-----	2,635	4,010
6		4,583	6,531	-----	6		10,427	2,578	13,463
7		3,437	6,818	11,286	7		12,145	15,010	14,323
8		6,359	9,223	12,031	8		13,979	15,583	15,010
9		6,760	9,510	13,406	9		13,520	14,781	10,083
10		6,760	9,854	13,406	10		13,406	16,270	12,145
11		3,495	1,490	1,719	11		9,281	2,406	3,896
12		2,693	1,604	1,776	12		9,625	2,234	4,068
13		3,552	1,490	1,719	13		9,625	2,292	3,781
14		3,953	1,490	1,719	14		9,567	2,349	3,838
15		3,380	1,432	1,661	15		9,739	2,406	3,609
16		3,781	1,604	1,776	16		10,312	2,635	3,896
17		4,239	1,719	1,719	17		11,458	2,349	4,010
18		5,042	1,833	1,776	18		12,375	2,578	3,838
19		5,729	1,490	1,776	19		12,604	2,177	3,838
20		5,557	1,490	1,719	20		11,573	3,151	4,010
21		2,693	1,375	1,604	21		8,250	3,667	4,182
22		2,005	1,203	1,547	22		8,479	3,953	4,068
23		1,719	1,203	974	23		8,594	4,469	3,781
24		1,031	1,260	1,089	24		7,104	3,667	3,953
25		1,031	1,089	974	25		9,968	6,359	4,755
26		630	630	745	26		6,818	6,932	4,526
27		458	802	687	27		9,396	7,276	5,901
28		344	458	630	28		9,281	5,901	4,984
29		286	573	573	29		10,255	6,302	5,328
30		458	802	573	30		10,198	6,302	5,271
31		458	687	687	31		10,083	8,021	5,672
32		458	745	687	32		10,198	5,614	4,755
33		745	802	802	33		10,198	5,328	5,099
34		458	401	802	34		4,927	3,781	3,266
35		687	917	859	35		9,166	3,953	4,698
36		1,031	1,031	1,031	36		9,052	5,156	4,297
37		3,781	1,661	1,719	37		10,427	3,151	3,896
38		3,094	1,604	1,719	38		10,141	3,036	3,953
39		3,838	1,547	1,719	39		9,625	3,552	3,896
40		2,750	1,547	1,547	40		10,083	3,437	3,896
41		2,292	1,604	1,547	41		9,467	3,896	3,953
42		3,667	1,604	1,719	42		9,510	3,094	3,896
43		3,838	1,661	1,719	43		10,656	3,094	4,010
44		3,437	1,490	1,719	44		8,537	2,693	3,495
45		4,125	1,604	1,719	45		9,510	2,349	3,896
46		4,870	1,490	1,661	46		10,312	1,833	2,578
49		229	687	802	49		9,739	7,620	5,271
50		115	573	516	50		8,135	7,161	4,698
52		115	115	401	52		8,880	6,818	4,068
53		115	172	401	53		6,531	4,755	1,661
54		115	745	516	54		7,333	5,557	4,927
55		115	458	573	55		8,880	5,099	4,927
56		115	115	115	56		229	286	57
57		115	115	115	57		286	229	115
58		115	115	115	58		229	229	115
59		115	115	115	59		286	344	115
60		115	115	115	60		687	344	115
61		115	115	115	61		630	344	115
62		115	115	115	62		401	344	57
63		115	229	115	63		401	401	115
64		115	115	115	64		458	344	115
65		115	115	115	65		516	458	115
66		115	57	57	66		401	229	57
67		115	115	115	67		516	344	115
68		115	229	172	68		974	516	115
69		229	57	57	69		1,089	458	115
70		115	57	115	70		802	573	115
71		115	57	115	71		4,239	573	344
72		115	57	115	72		3,380	573	344
73		115	115	115	73		1,146	229	115
74		115	115	115	74		1,031	630	115
75		115	229	115	75		1,490	401	115
76		115	57	115	76		917	229	115

(Continued)

* Base test 1954 published discharge not taken. 1954 routed discharge taken on cycles 304-305-306-307. Closure test 1954 published discharge taken on cycles 304-305-306-307. Closure test 1954 routed discharge taken on cycles 360-361-362-363.

** Base test 1954 published discharge not taken. 1954 routed discharge taken on cycles 560-561-562-563. Closure test 1954 published discharge taken on cycles 560-561-562-563. Closure test 1954 routed discharge taken on cycles 749-750-751-752.

Table 6 (Continued)

Low Salinity, Second Year*

Station	Base Test 1954 Published Discharge	1954 Routed Discharge	Closure Test, 1954 Published Discharge	Closure Test, 1954 Routed Discharge
1	2,120	3,208		630
2	2,922	4,354		2,120
3	2,292	5,099		2,177
4	3,151	4,927		2,521
5	2,349	4,927		11,286
5X	-----	-----		2,635
6	3,036	4,068		9,682
7	3,380	3,609		11,630
8	3,552	4,927		12,718
9	3,495	4,927		12,775
10	3,495	5,042		12,489
11	2,521	4,010		1,432
12	1,776	2,922		2,234
13	1,604	2,865		2,120
14	2,177	3,724		2,120
15	2,005	3,380		2,062
16	1,948	4,354		2,234
17	3,094	4,125		2,234
18	2,979	3,781		2,521
19	2,979	4,469		2,234
20	2,292	3,609		2,349
21	1,547	2,635		2,292
22	1,604	1,719		2,234
23	687	1,375		2,120
24	630	802		2,005
25	573	1,260		1,833
26	401	286		1,375
27	344	458		1,661
28	286	286		1,089
29	344	401		1,146
30	516	401		1,260
31	458	516		1,375
32	458	687		1,490
33	458	687		1,260
34	344	516		286
35	344	458		974
36	401	458		1,203
37	1,661	3,380		2,005
38	2,005	2,521		1,776
39	1,661	3,323		1,203
40	917	2,693		1,146
41	2,234	2,234		1,776
42	2,292	4,125		2,062
43	2,062	4,755		2,120
44	2,521	3,724		1,719
45	2,922	4,297		1,547
46	1,948	4,010		1,833
49	401	401		1,260
50	115	229		802
52	172	115		802
53	115	115		573
54	172	172		1,089
55	172	229		1,203
56	115	115		115
57	115	172		115
58	115	115		172
59	115	344		115
60	115	115		115
61	115	115		57
62	57	115		115
63	115	115		115
64	57	115		115
65	115	115		57
66	115	115		115
67	115	115		115
68	115	229		115
69	115	115		115
70	115	115		115
71	115	115		115
72	115	115		172
73	115	115		115
74	115	115		115
75	115	115		57
76	115	115		115

High Salinity, Second Year**

Station	Base Test 1954 Published Discharge	1954 Routed Discharge	Closure Test, 1954 Published Discharge	Closure Test, 1954 Routed Discharge
1	7,104	8,594		2,979
2	7,677	11,000		3,266
3	9,739	11,744		3,380
4	11,859	13,062		3,266
5	8,937	9,510		12,202
5X	-----	-----		3,266
6	9,797	10,427		3,151
7	12,031	12,145		12,145
8	12,375	13,979		13,979
9	12,145	13,520		13,120
10	12,375	13,406		13,979
11	8,823	9,281		3,208
12	7,276	9,625		3,266
13	7,161	9,625		3,323
14	7,677	9,567		3,437
15	7,276	9,739		3,323
16	8,422	10,312		3,151
17	11,000	11,458		2,979
18	11,057	12,375		3,036
19	11,229	12,604		3,036
20	10,828	11,573		3,437
21	8,021	9,281		3,781
22	6,932	8,651		4,068
23	5,901	8,594		4,010
24	4,870	7,734		4,010
25	5,557	9,968		4,927
26	5,901	9,166		3,781
27	6,302	10,427		4,698
28	5,729	10,427		2,234
29	5,729	10,255		3,437
30	4,812	10,198		3,838
31	6,073	10,369		4,870
32	5,844	10,198		3,838
33	5,328	10,198		3,838
34	2,635	5,385		1,776
35	5,213	9,166		3,094
36	4,927	9,052		4,239
37	7,333	10,427		3,609
38	6,302	10,141		2,922
39	8,021	9,625		3,323
40	7,333	10,083		3,781
41	8,078	9,467		4,125
42	8,078	9,510		4,010
43	8,021	10,656		3,323
44	7,276	8,537		3,151
45	8,479	9,510		3,208
46	7,104	10,312		2,234
49	5,844	9,739		4,239
50	4,411	9,109		2,349
52	4,698	8,880		1,089
53	2,922	8,994		401
54	4,870	8,651		2,635
55	5,844	10,255		3,094
56	57	1,089		115
57	172	286		172
58	115	229		229
59	229	286		917
60	172	687		229
61	57	630		229
62	229	401		172
63	57	401		115
64	57	458		229
65	115	516		229
66	115	401		172
67	115	516		115
68	115	974		172
69	344	1,089		229
70	115	802		344
71	57	4,239		3,495
72	115	3,380		2,005
73	115	1,146		286
74	57	1,031		286
75	172	1,490		286
76	57	917		172

* Base test 1954 published discharge taken on cycles 1006-1007-1008-1009. 1954 routed discharge taken on cycles 1006-1007-1008-1009. Closure test 1954 published discharge not taken. Closure test 1954 routed discharge taken on cycles 1108-1109-1110-1111.

** Base test 1954 published discharge taken on cycles 1262-1263-1264-1265. Test 1954 routed discharge taken on cycles 1262-1263-1264-1265. Closure test 1954 published discharge not taken. Closure test 1954 routed discharge taken on cycles 1478-1479-1480-1481.

Table 7

Salinity Tests, 1955 Routed Discharge Hydrographs
Salinity in ppm

Condition	Station 1	3	5	13	27	29	34	40	46	52
Cycles 8-9										
Base test	-----	8,651	7,161	4,927	6,187	7,906	2,979	7,505	5,443	-----
Closure test	-----	6,359	5,271	4,755	8,937	4,927	2,177	4,927	4,583	-----
Withdrawal test	-----	5,729	5,672	2,865	10,427	5,156	286	6,302	2,807	-----
Cycles 20-21										
Base test	5,213	8,307	9,281	6,015	10,885	5,156	4,927	7,390	6,359	6,130
Closure test	4,411	5,901	6,187	4,526	8,135	4,640	2,292	4,526	4,411	5,271
Withdrawal test	3,495	5,672	6,818	3,266	9,453	5,672	1,833	5,844	2,635	6,703
Cycles 47-48										
Base test	4,239	7,161	5,156	5,099	8,880	5,099	3,495	6,989	3,495	3,437
Closure test	3,495	5,156	5,958	3,437	6,015	2,979	1,432	4,239	2,005	2,521
Withdrawal test	3,380	5,328	4,698	3,667	7,448	3,609	1,031	5,500	1,833	2,807
Cycles 74-75										
Base test	1,490	6,187	3,208	2,922	6,474	3,094	1,490	6,073	344	3,781
Closure test	2,234	5,156	4,812	3,208	4,239	3,151	1,719	3,667	516	2,463
Withdrawal test	1,021	5,156	2,463	2,234	5,557	2,922	1,776	4,870	229	3,437
Cycles 101-102										
Base test	1,260	4,870	1,203	2,693	5,099	2,979	115	3,724	401	1,089
Closure test	2,349	4,068	4,469	2,120	3,437	2,234	630	2,635	458	2,234
Withdrawal test	802	4,010	1,776	1,833	4,297	2,234	458	3,151	115	1,547
Cycles 128-129										
Base test	1,719	3,781	2,693	2,521	2,807	1,432	115	3,323	2,005	115
Closure test	2,635	3,609	3,380	1,490	2,234	1,661	516	2,234	1,776	458
Withdrawal test	1,604	3,667	2,062	2,005	2,693	1,031	115	3,151	1,891	172
Cycles 155-156										
Base test	2,062	3,609	2,234	2,234	1,432	687	917	3,094	2,521	115
Closure test	2,521	3,266	2,521	1,432	1,089	687	917	2,005	1,891	344
Withdrawal test	1,719	3,208	1,547	1,776	1,260	401	573	2,406	1,891	115
Cycles 182-183										
Base test	2,120	3,094	1,547	1,604	745	458	516	2,292	2,463	229
Closure test	1,719	2,922	1,661	1,719	458	286	516	1,661	2,349	115
Withdrawal test	1,719	2,349	1,089	1,318	516	286	458	1,833	1,833	115
Cycles 209-210										
Base test	630	1,719	1,719	917	401	286	172	1,547	286	172
Closure test	859	1,948	630	344	286	286	344	802	229	115
Withdrawal test	573	1,719	1,031	344	286	286	172	1,432	172	172

(Continued)

Table 7 (Continued)

Condition	Station 1	3	5	13	27	29	34	40	46	52
					Cycles 236-237					
Base test	859	1,604	1,375	630	229	115	115	1,089	735	115
Closure test	859	1,547	458	687	172	115	172	859	1,260	115
Withdrawal test	802	1,260	1,089	573	172	172	172	573	802	172
					Cycles 249-250					
Base test	802	1,490	1,146	630	172	172	229	974	917	115
Closure test	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Withdrawal test	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
					Cycles 263-264					
Base test	573	1,260	1,146	573	172	229	115	802	573	115
Closure test	802	1,260	573	1,031	115	115	115	344	917	115
Withdrawal test	573	974	1,146	458	229	172	229	516	573	172
					Cycles 279-280-281-282					
Base test	516	1,375	1,089	458	172	229	115	802	458	115
Closure test	802	1,260	1,146	687	229	172	172	516	401	172
Withdrawal test	401	1,031	802	401	115	115	115	573	344	115
					Cycles 290-291					
Base test	516	1,604	1,432	630	344	172	229	802	573	115
Closure test	745	1,146	1,146	687	115	172	115	630	458	115
Withdrawal test	458	630	573	458	172	172	115	516	458	172
					Cycles 303-304					
Base test	573	1,661	1,432	603	229	229	115	687	630	172
Closure test	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Withdrawal test	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
					Cycles 317-318					
Base test	573	2,120	1,661	802	115	115	115	745	687	115
Closure test	687	802	745	687	229	229	172	745	917	172
Withdrawal test	516	687	630	516	172	172	172	516	573	115
					Cycles 344-345					
Base test	687	2,234	1,833	630	115	115	115	1,318	974	115
Closure test	745	917	745	802	286	229	172	802	859	172
Withdrawal test	458	458	573	401	57	57	172	458	516	115
					Cycles 371-372					
Base test	917	2,750	2,463	1,375	286	286	115	2,177	516	115
Closure test	687	974	859	687	401	286	229	802	516	172
Withdrawal test	516	458	458	401	115	172	115	573	458	115
					Cycles 398-399					
Base test	974	2,292	2,693	1,661	573	516	115	2,863	859	115
Closure test	516	687	687	745	401	344	172	630	458	229
Withdrawal test	458	458	516	516	172	172	115	516	401	115

(Continued)

Table 7 (Continued)

Condition	Station 1	3	5	13	27	29	34	40	46	52
					Cycles 425-426					
Base test	573	3,552	2,578	1,490	745	630	115	2,578	573	229
Closure test	401	802	687	630	458	401	172	630	172	229
Withdrawal test	401	573	401	344	172	115	115	458	458	115
					Cycles 452-453					
Base test	2,062	5,672	4,755	2,922	1,146	917	286	4,068	2,349	573
Closure test	573	687	630	688	401	401	172	573	573	229
Withdrawal test	344	401	401	286	516	344	115	286	229	115
					Cycles 479-480					
Base test	3,437	7,620	6,015	3,427	2,062	1,604	859	5,328	3,266	1,203
Closure test	516	687	573	573	1,604	974	115	516	630	458
Withdrawal test	286	401	344	286	2,750	687	401	401	286	172
					Cycles 506-507					
Base test	4,239	8,364	7,620	5,500	3,896	2,922	1,490	5,958	5,099	2,349
Closure test	573	802	630	573	3,724	3,437	229	630	573	1,604
Withdrawal test	401	573	401	458	3,437	2,234	1,203	802	458	917
					Cycles 533-534					
Base test	5,729	8,765	6,302	5,786	4,870	4,354	2,406	6,760	5,672	3,609
Closure test	573	802	630	573	4,182	5,271	1,203	745	344	3,724
Withdrawal test	745	745	573	745	5,213	4,583	3,036	1,490	745	2,750
					Cycles 560-561					
Base test	6,359	9,510	7,219	6,416	4,812	4,640	3,380	7,104	6,703	4,068
Closure test	687	802	687	630	5,385	5,557	2,979	1,146	573	4,755
Withdrawal test	1,203	1,604	974	1,203	3,781	3,552	4,068	2,865	1,203	1,547
					Cycles 587-588					
Base test	7,219	9,223	8,135	7,448	4,698	3,781	3,036	7,333	6,932	4,239
Closure test	802	1,146	802	745	5,557	5,328	3,896	2,177	630	4,927
Withdrawal test	1,776	1,661	1,661	2,062	2,463	3,838	4,182	3,323	1,776	1,833
					Cycles 600-601					
Base test	7,562	9,453	8,880	7,219	4,583	4,354	3,838	7,963	7,620	4,125
Closure test	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Withdrawal test	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
					Cycles 611-612-613-614-615					
Base test	7,562	9,625	8,708	7,562	5,213	4,583	3,724	7,562	8,021	4,354
Closure test	1,031	1,432	1,031	1,031	4,125	4,755	3,838	2,292	630	4,640
Withdrawal test	2,521	2,578	2,120	2,635	5,042	3,208	4,010	3,437	1,203	2,120
					Cycles 641-642					
Base test	5,786	8,708	9,052	6,818	5,729	5,156	1,719	6,760	4,469	4,640
Closure test	1,031	1,604	1,490	859	4,640	5,042	1,318	2,521	286	5,557
Withdrawal test	3,036	2,635	2,807	2,979	3,724	3,495	2,349	3,437	3,094	2,521

(Continued)

Table 7 (Continued)

Condition	Station 1	3	5	13	27	29	34	40	46	52
					Cycles 668-669					
Base test	4,927	7,677	6,760	5,385	5,213	4,870	3,380	6,073	4,125	4,812
Closure test	1,089	1,604	1,203	630	4,411	4,125	1,661	1,776	286	5,557
Withdrawal test	3,094	3,151	3,151	3,266	3,437	3,208	3,667	3,609	3,437	2,578
					Cycles 680-681-682-683					
Base test	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Closure test	1,490	1,719	1,318	1,490	4,010	3,781	2,865	1,891	344	5,213
Withdrawal test	3,437	3,380	3,094	3,208	4,984	3,151	3,898	3,724	3,323	2,750
					Cycles 695-696					
Base test	5,786	7,276	6,359	6,015	4,640	4,411	3,495	6,073	5,672	4,812
Closure test	1,719	1,776	1,375	1,661	4,526	3,667	3,323	2,005	974	5,271
Withdrawal test	3,495	3,609	3,036	3,667	4,870	3,323	4,068	4,016	3,609	3,094
					Cycles 710-711					
Base test	5,844	7,333	6,359	5,786	4,755	4,411	3,323	6,760	5,099	4,469
Closure test	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Withdrawal test	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
					Cycles 722-723					
Base test	5,385	7,161	6,760	5,729	4,698	4,239	2,979	5,844	4,755	3,208
Closure test	1,948	1,833	1,604	1,719	3,495	3,268	2,521	2,406	1,203	3,036
Withdrawal test	3,437	3,323	3,208	3,437	4,125	2,922	3,495	3,838	3,437	1,833
					Cycles 749-750					
Base test	3,896	6,474	3,437	4,182	3,151	2,865	917	5,213	2,177	1,776
Closure test	1,375	1,891	1,547	1,661	2,922	2,234	974	2,177	458	2,120
Withdrawal test	3,552	3,609	3,437	3,724	3,437	2,234	1,833	3,781	3,667	516
					Cycles 776-777					
Base test	859	5,042	974	1,661	2,750	2,349	630	4,354	115	2,635
Closure test	859	1,948	2,005	1,719	2,750	2,177	687	1,948	115	2,865
Withdrawal test	2,463	3,667	3,495	3,266	2,865	2,578	802	3,495	2,693	1,833
					Cycles 803-804					
Base test	516	3,323	2,578	1,375	1,719	1,776	57	2,922	172	974
Closure test	516	1,719	1,490	1,203	1,948	1,719	172	1,547	115	1,203
Withdrawal test	2,177	3,266	3,208	2,750	2,463	1,490	172	2,807	2,922	516
					Cycles 830-831					
Base test	917	3,036	745	1,318	1,203	1,318	115	2,234	1,604	229
Closure test	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Withdrawal test	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Table 8

Hydrographs

Hurricane Rainfall of September 1947

Discharge in cfs

Day	Atchafalaya River Wax Lake	Atchafalaya River Morgan City	Bayou Teche	Weeks Bayou, Cypremort Bayou, and Bayou Carlin	Bayou Petite Anse	Vermilion River Basin
20	13,700	54,600	529	859	0	114
21	13,000	51,800	512	690	0	130
22	12,900	51,400	1,040	2,030	0	278
23	12,200	48,900	428	475	0	147
24	11,800	47,400	343	261	0	130
25	11,500	45,900	307	168	0	151
26	11,200	44,800	288	122	0	147
Avg	12,328.6	49,257.1	492.4	657.9	0	156.7

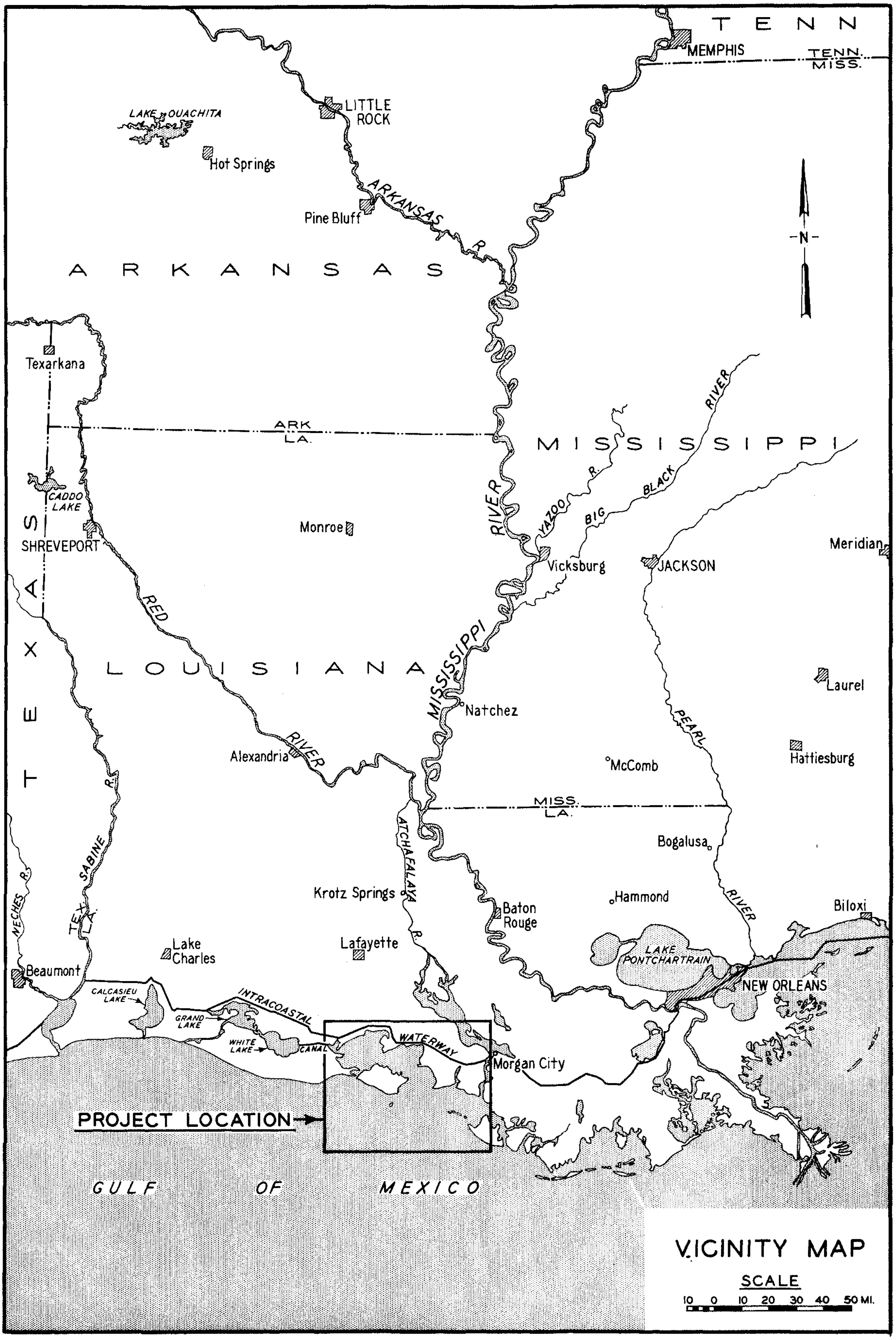
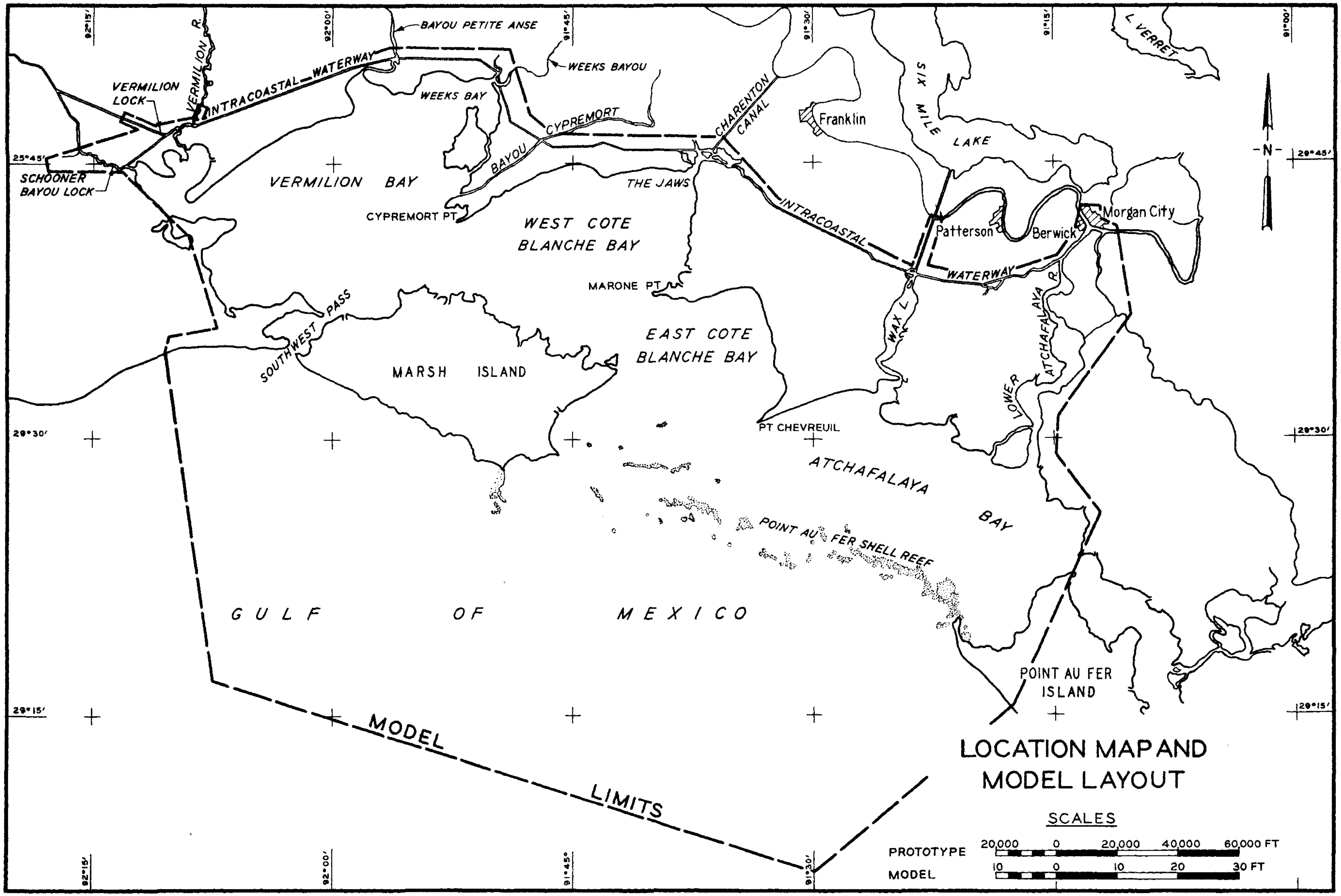
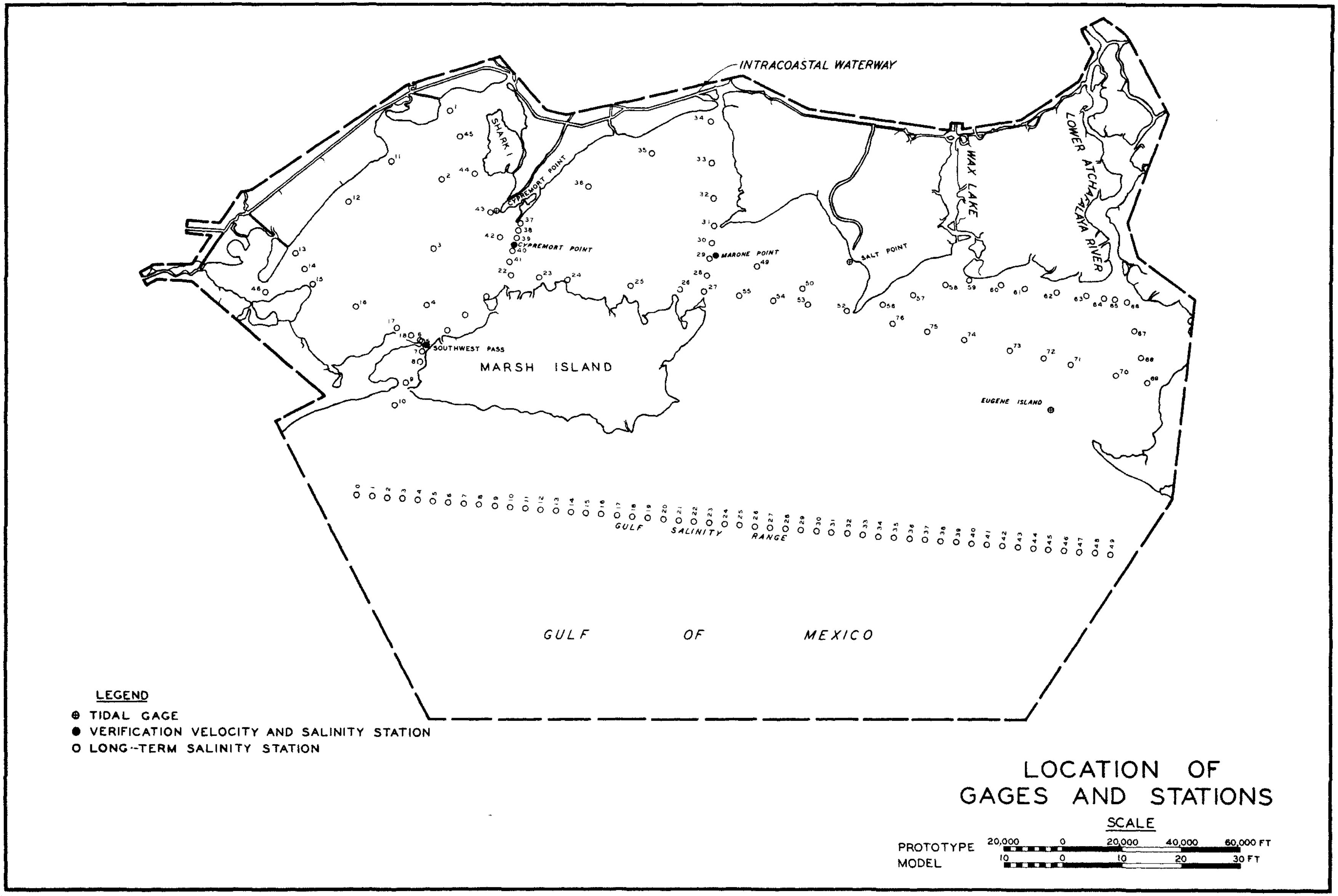

TENN
MEMPHIS
TENN.
MISS.
LITTLE ROCK
LAKE OUACHITA
Hot Springs
ARKANSAS R.
Pine Bluff
ARKANSAS
N
Texarkana
ARK.
LA.
MISSISSIPPI
CADDO LAKE
SHREVEPORT
Monroe
RIVER
YAZOO R.
BIG BLACK RIVER
Vicksburg
JACKSON
Meridian
TEXAS
RED RIVER
LOUISIANA
MISSISSIPPI
Natchez
Laurel
PEARL
Alexandria
McComb
Hattiesburg
MISS.
LA.
SABINE R.
NECHES R.
ATCHAFALAYA R.
Bogalusa
Krotz Springs
Hammond
Baton Rouge
RIVER
Biloxi
TEX.
LA.
Lake Charles
Lafayette
LAKE PONTCHARTRAIN
Beaumont
NEW ORLEANS
CALCASIEU LAKE
GRAND LAKE
INTRACOASTAL
WHITE LAKE
CANAL
WATERWAY
Morgan City
PROJECT LOCATION
GULF OF MEXICO
VICINITY MAP
SCALE
10 0 10 20 30 40 50 MI.

PLATE 1

PLATE 2

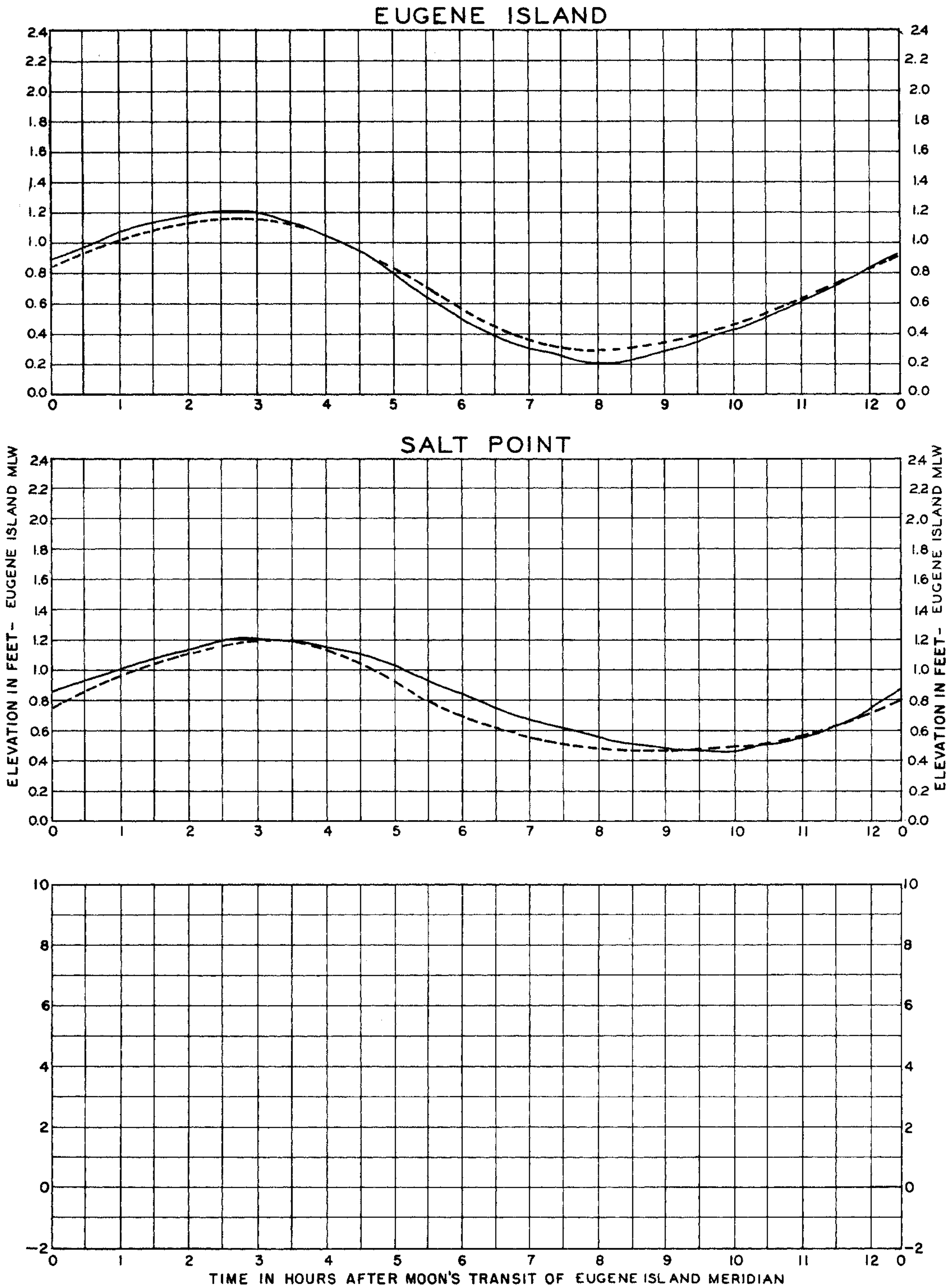


LOCATION MAP AND MODEL LAYOUT



LOCATION OF GAGES AND STATIONS

PLATE 3

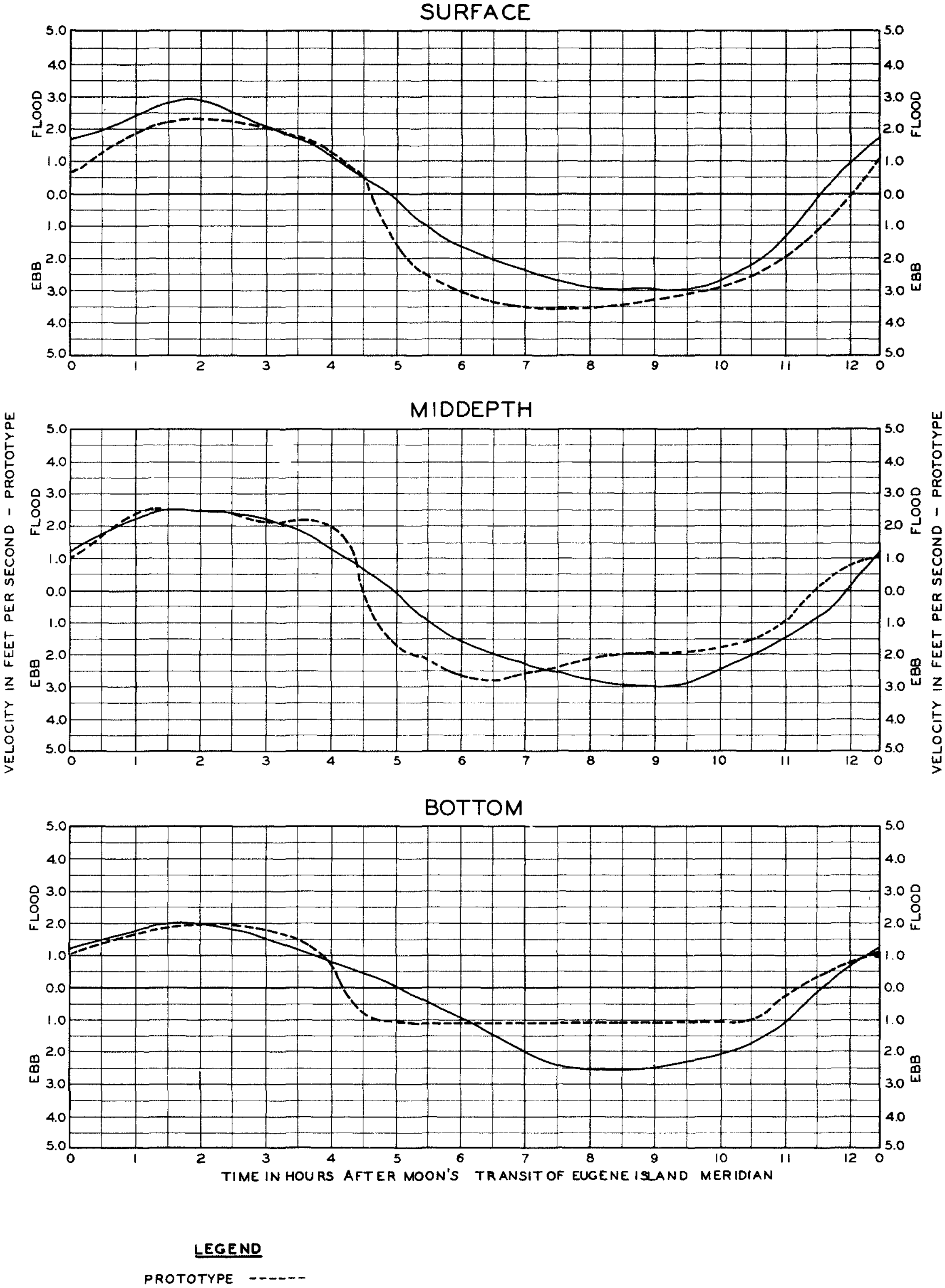


LEGEND

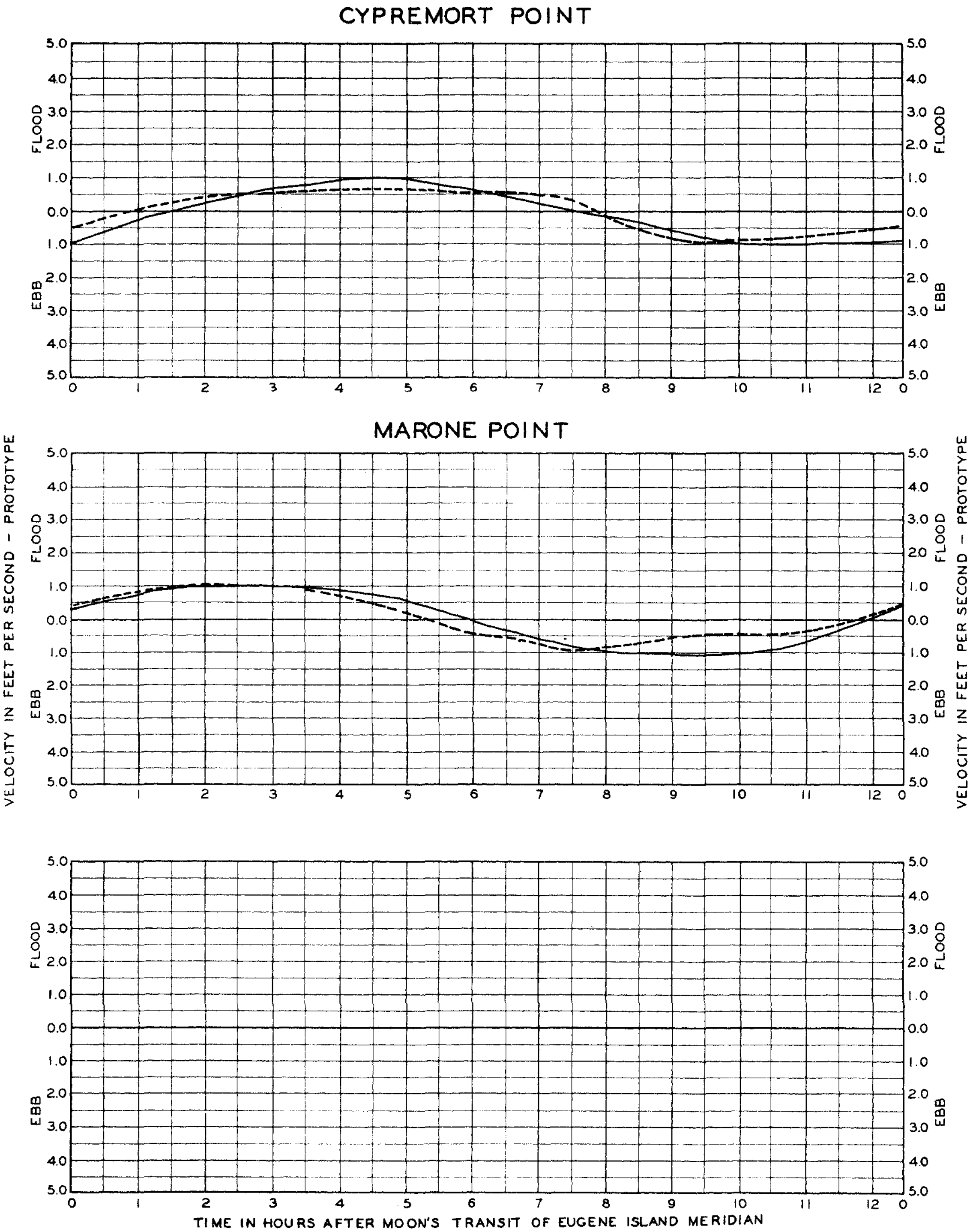
PROTOTYPE ------
MODEL ———

VERIFICATION TIDAL HEIGHTS

PLATE 4



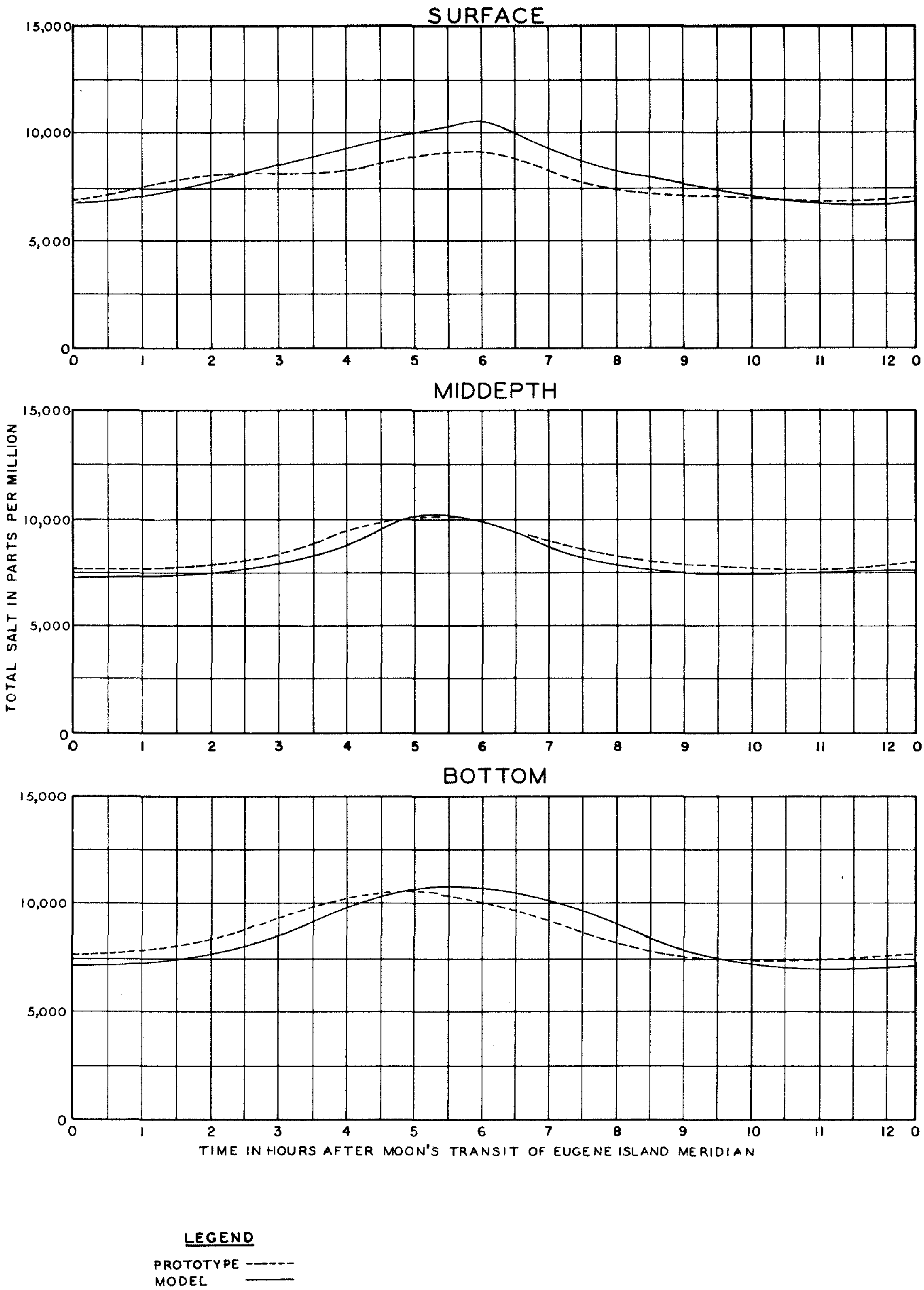
VERIFICATION
CURRENT VELOCITY
SOUTHWEST PASS



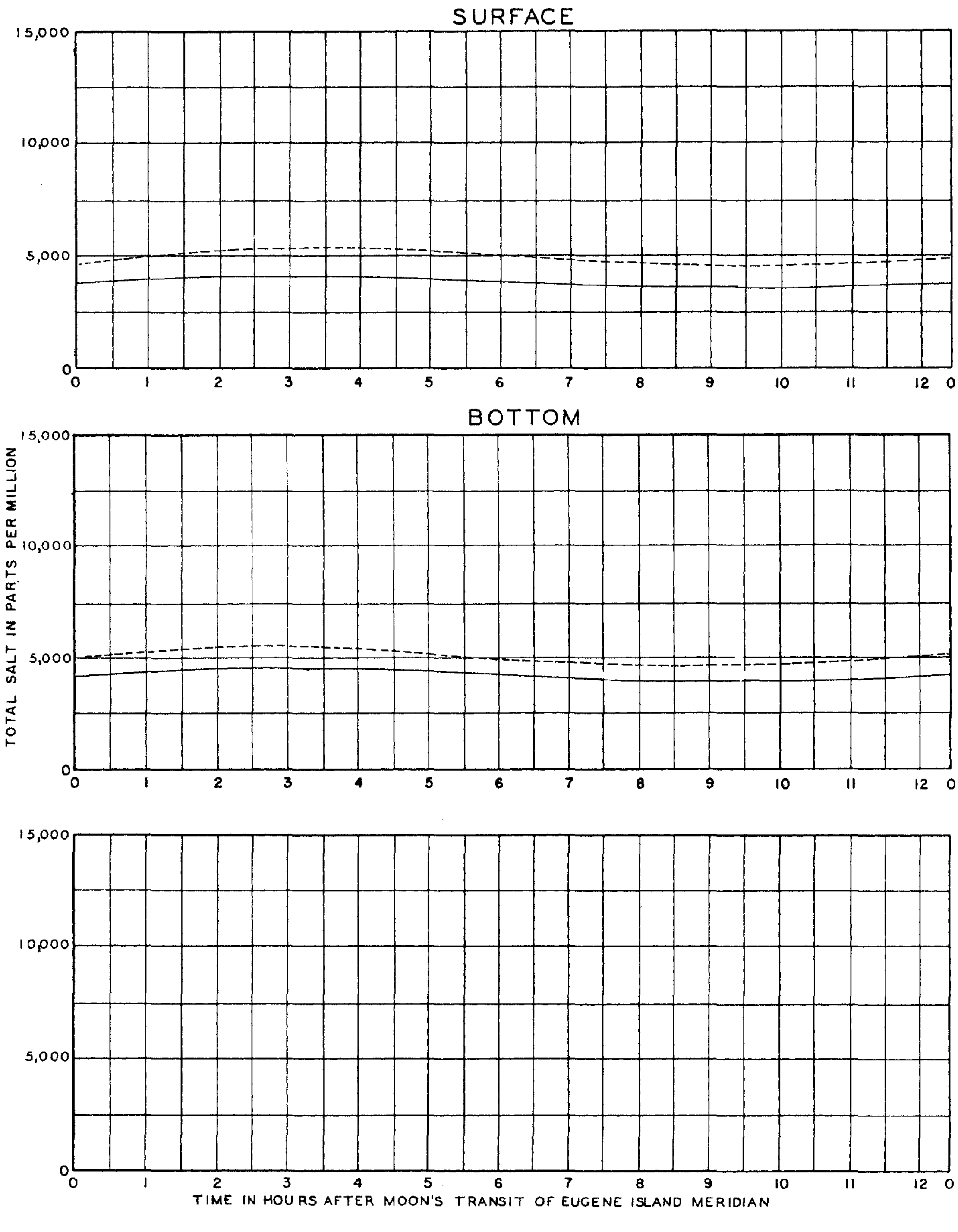
LEGEND

PROTOTYPE ------
MODEL ———

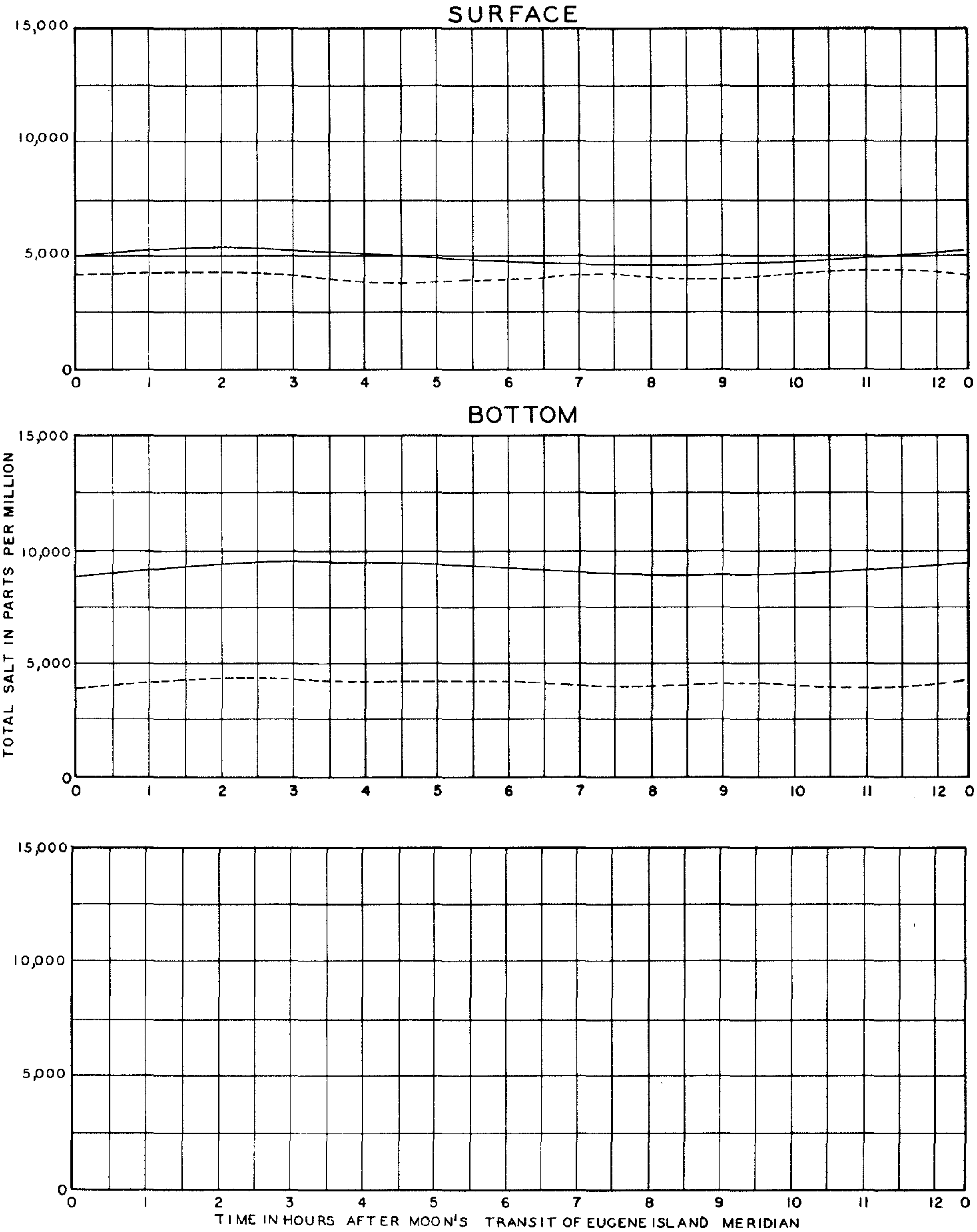
VERIFICATION
CURRENT VELOCITY
CYPREMORT AND MARONE POINTS



SHORT – PERIOD SALINITY VERIFICATION
SOUTHWEST PASS



SHORT – PERIOD
SALINITY VERIFICATION
MARONE POINT



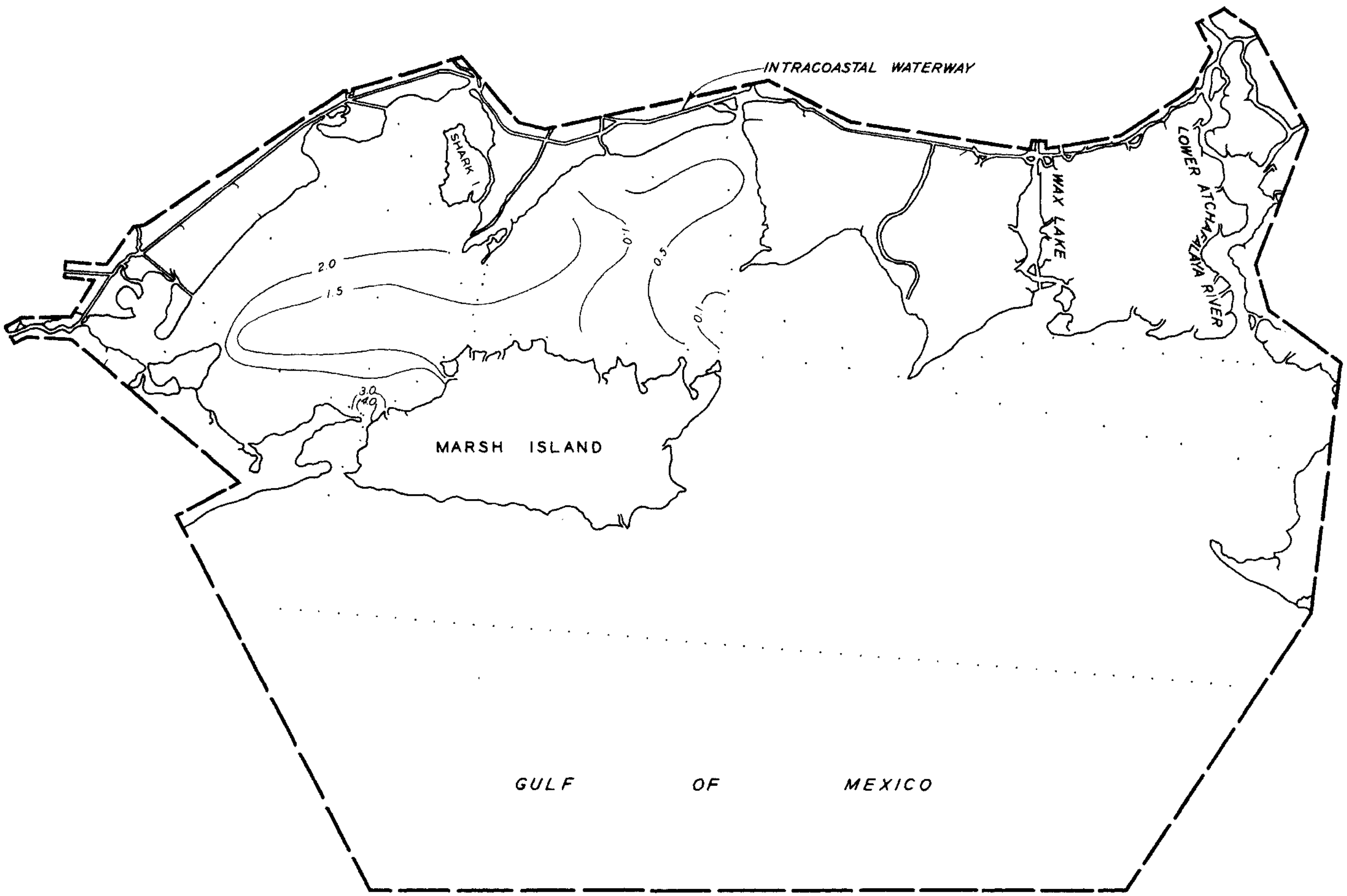
LEGEND

PROTOTYPE ------
MODEL ———

SHORT – PERIOD SALINITY VERIFICATION

CYPREMORT POINT

PLATE 10

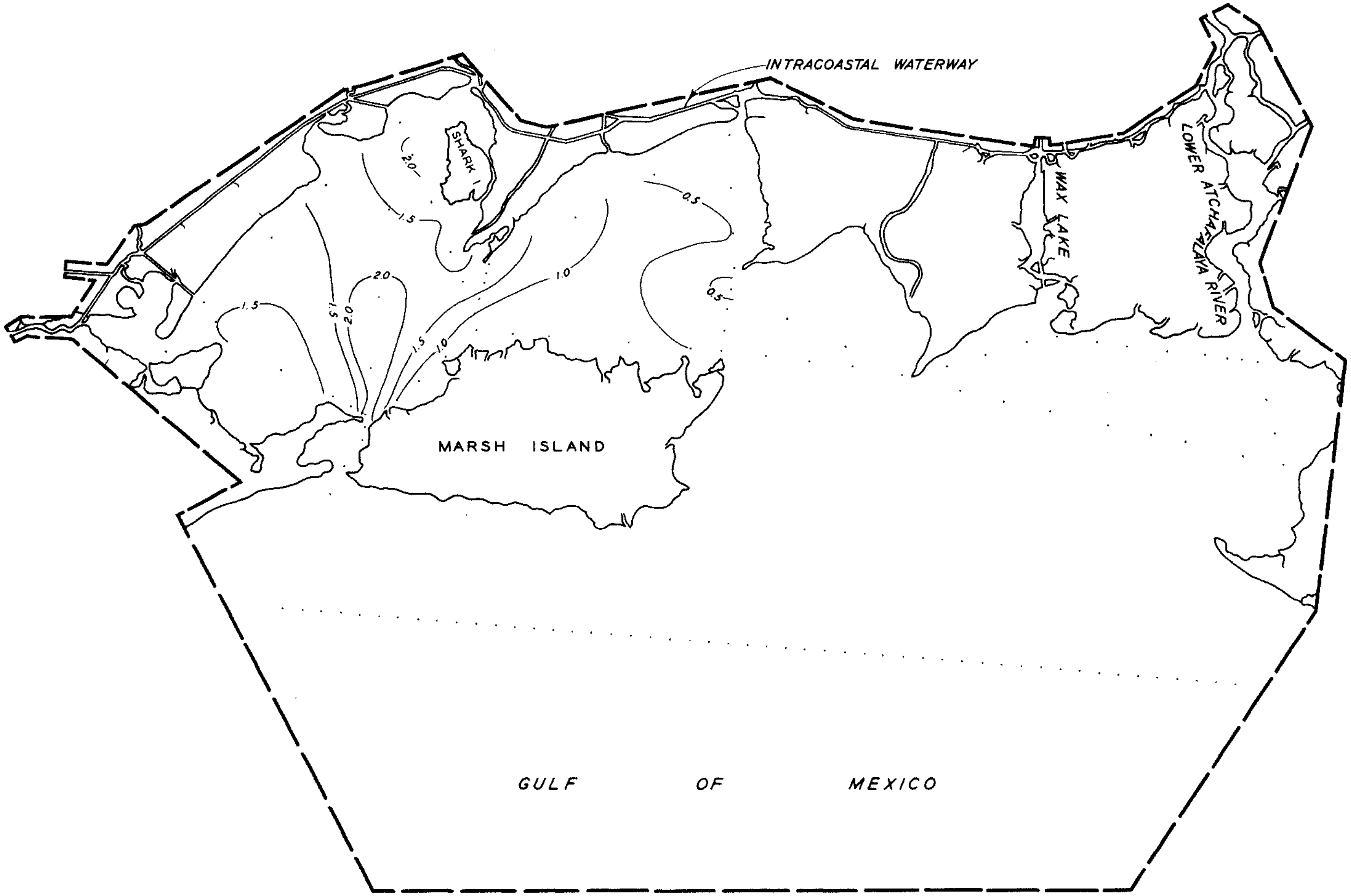


NOTE: ISOCHLORS IN PARTS PER THOUSAND.

PROTOTYPE
SALINITY SURVEY
23 MARCH 1955

SCALE

PROTOTYPE	20,000	0	20,000	40,000	60,000 FT
MODEL	10	0	10	20	30 FT



NOTE: ISOCHLORS IN PARTS PER THOUSAND.

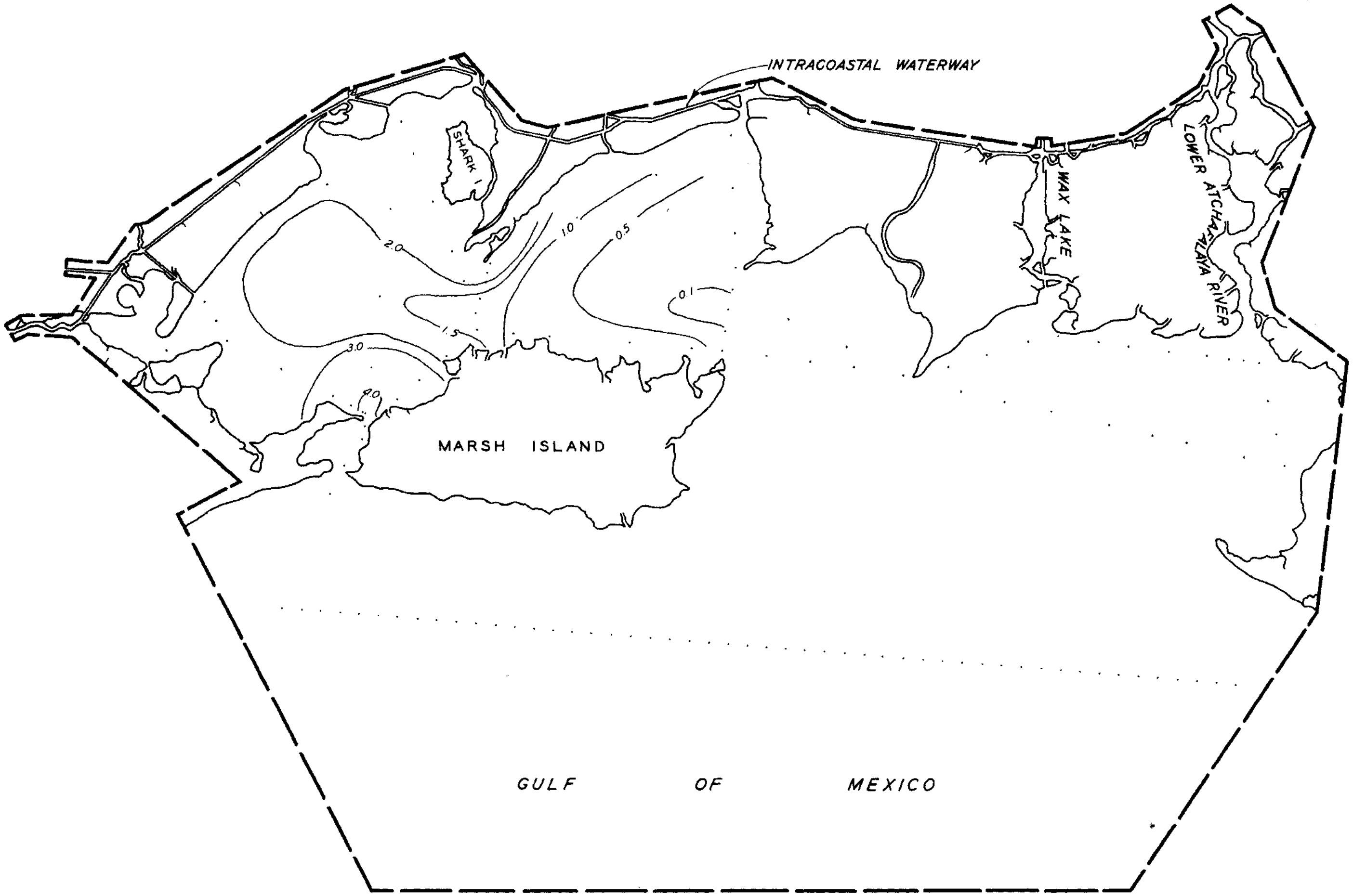
MODEL SALINITY SURVEY

23 MARCH 1955

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT

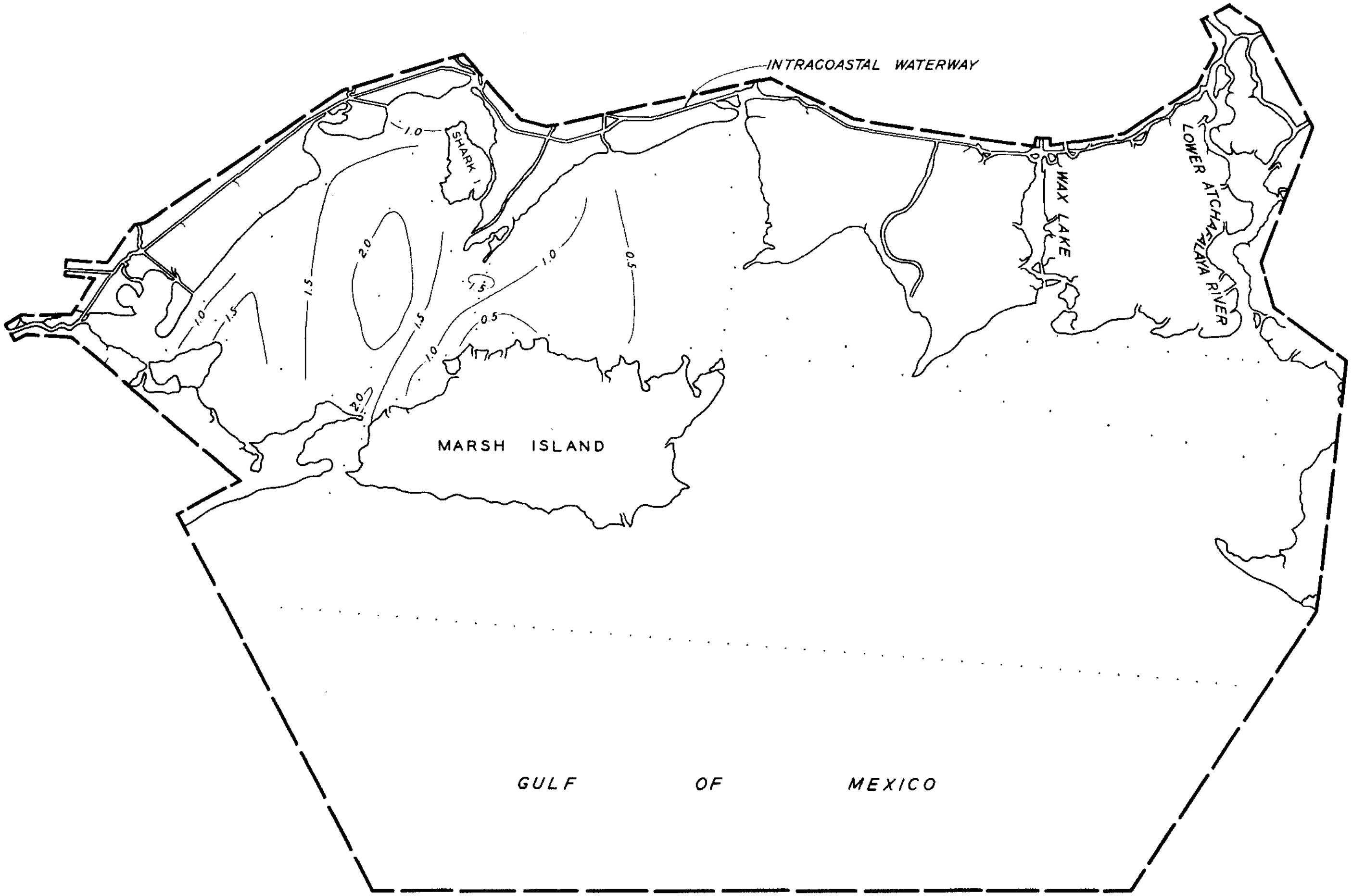


NOTE: ISOCHLORS IN PARTS PER THOUSAND.

PROTOTYPE
SALINITY SURVEY
30 MARCH 1955

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT



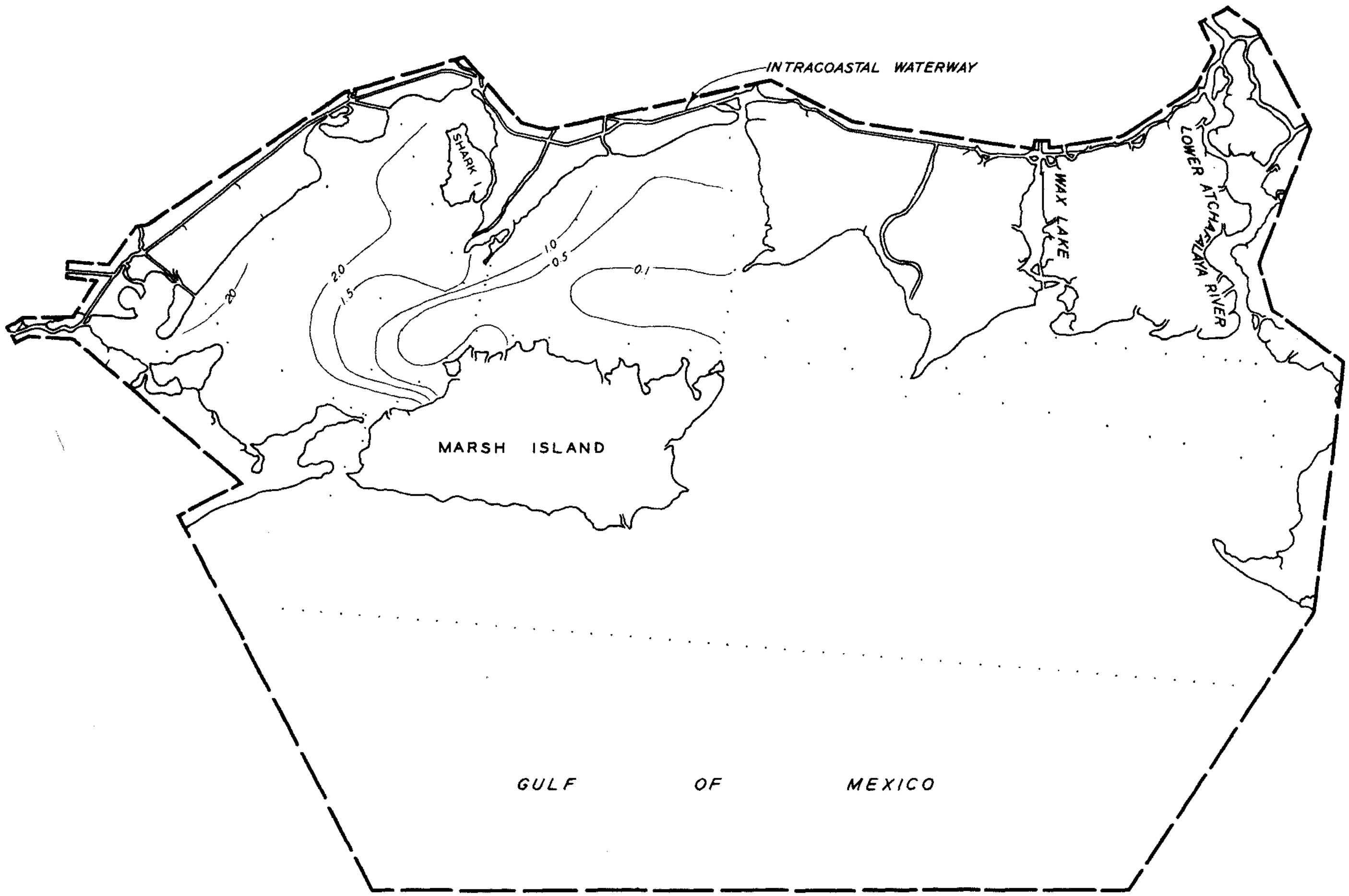
NOTE: ISOCHLORS IN PARTS PER THOUSAND.

MODEL
SALINITY SURVEY
30 MARCH 1955

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT

PLATE 14



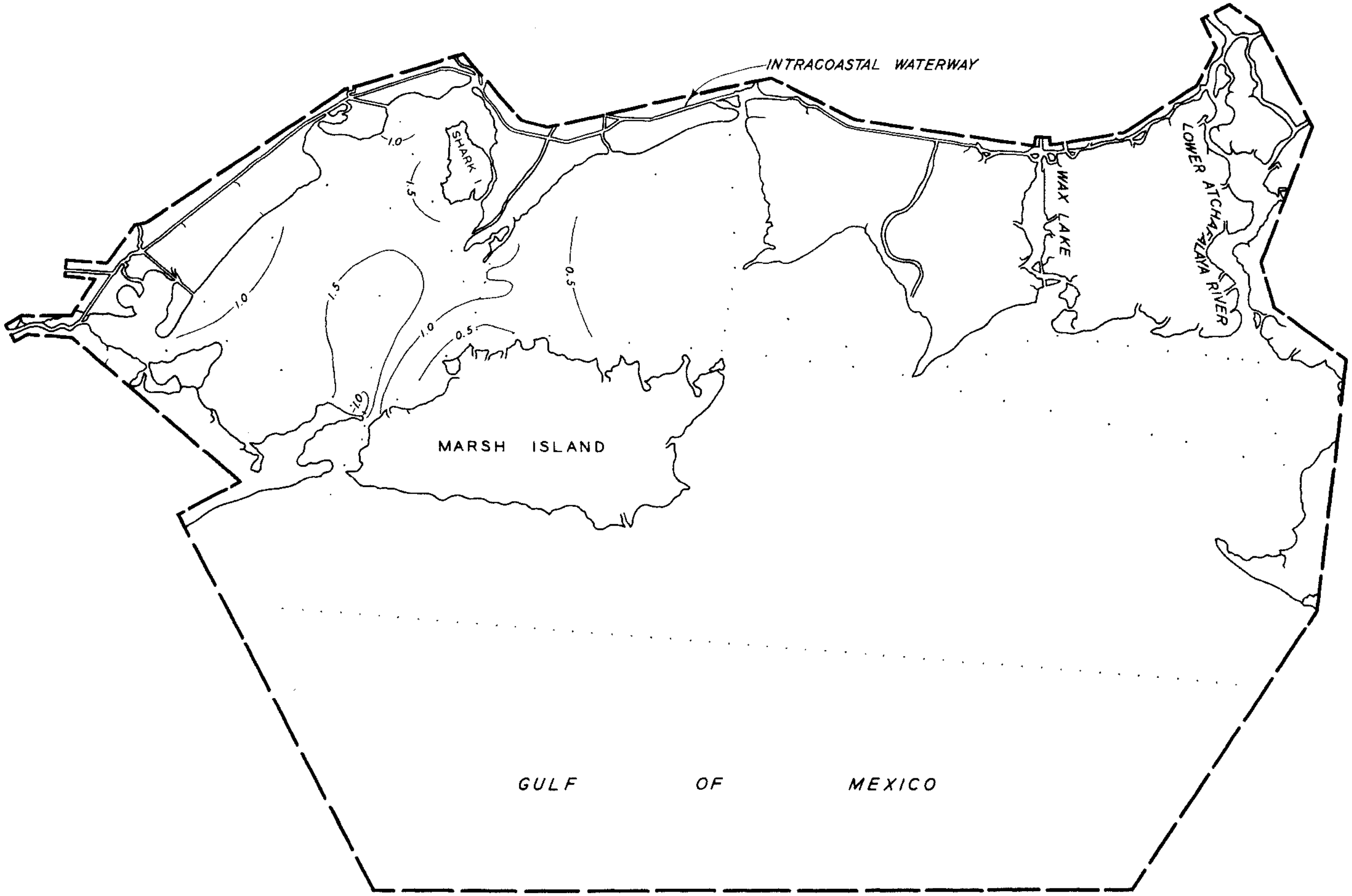
NOTE: ISOCHLORS IN PARTS PER THOUSAND.

PROTOTYPE SALINITY SURVEY

5 APRIL 1955

SCALE

PROTOTYPE	20,000	0	20,000	40,000	60,000 FT
MODEL	10	0	10	20	30 FT

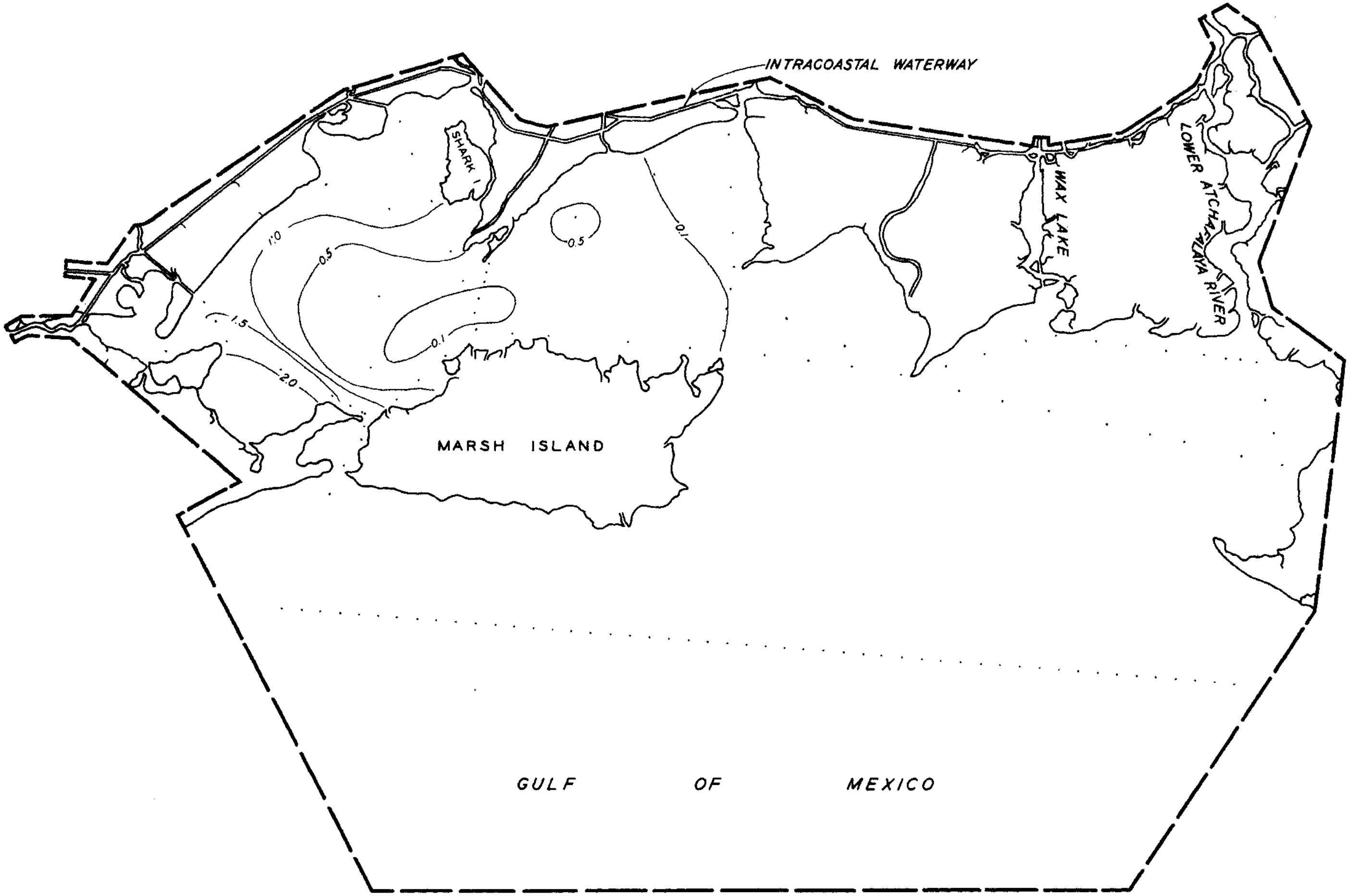


NOTE: ISOCHLORS IN PARTS PER THOUSAND.

MODEL
SALINITY SURVEY
5 APRIL 1955

SCALE
PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT

PLATE 15



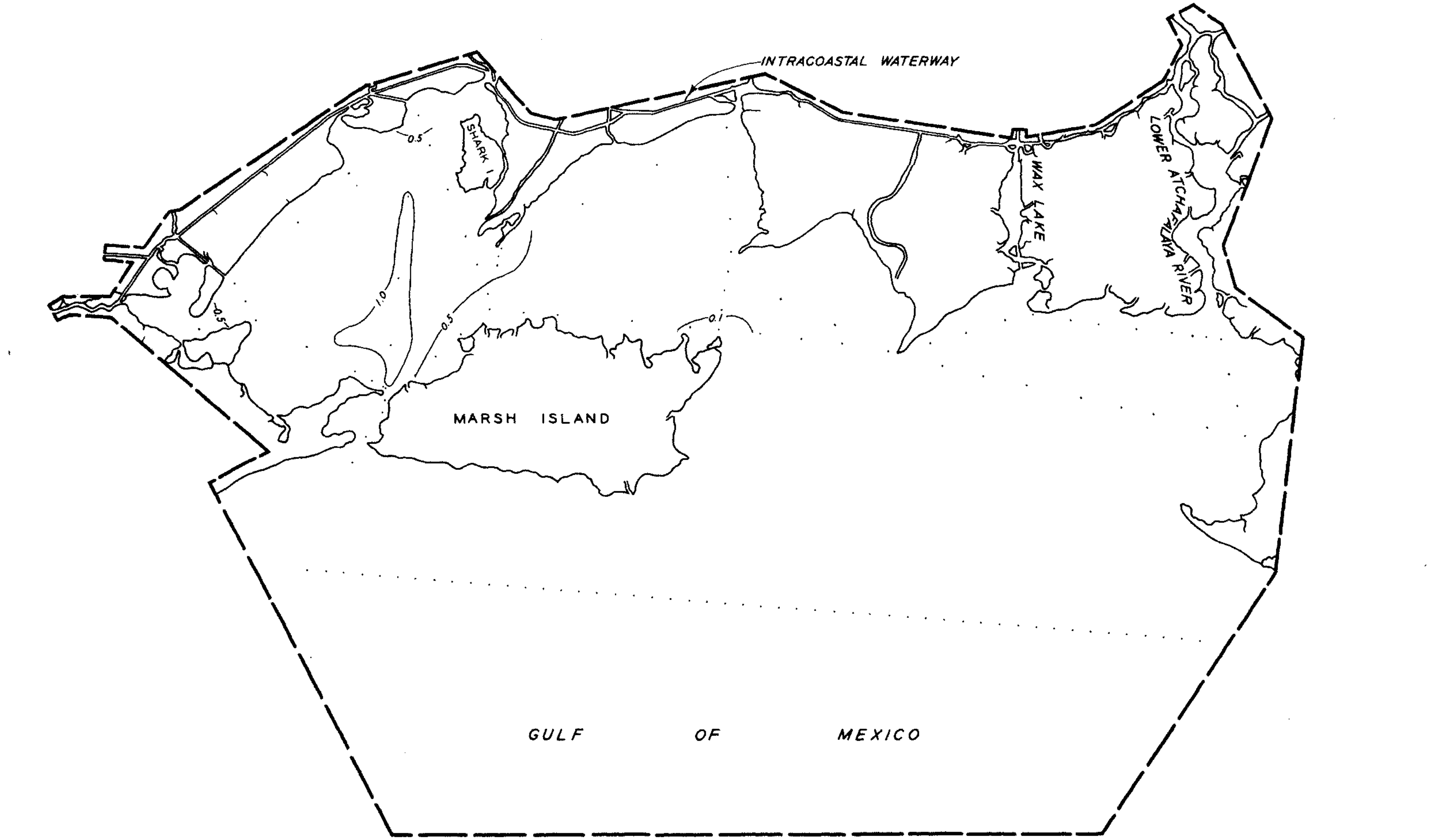
PROTOTYPE SALINITY SURVEY
21 APRIL 1955

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT



NOTE: ISOCHLORS IN PARTS PER THOUSAND.

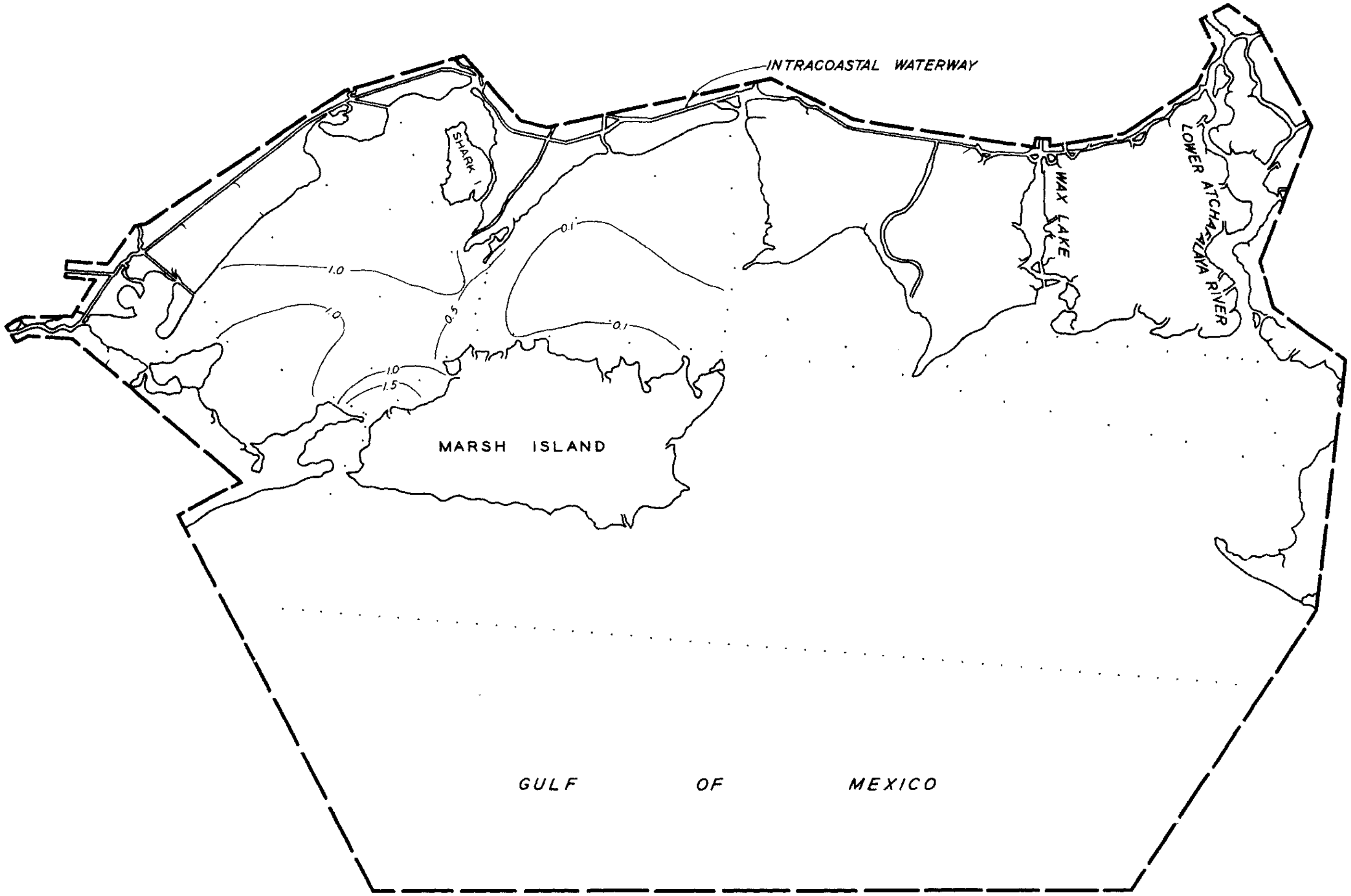
MODEL SALINITY SURVEY

21 APRIL 1955

SCALE

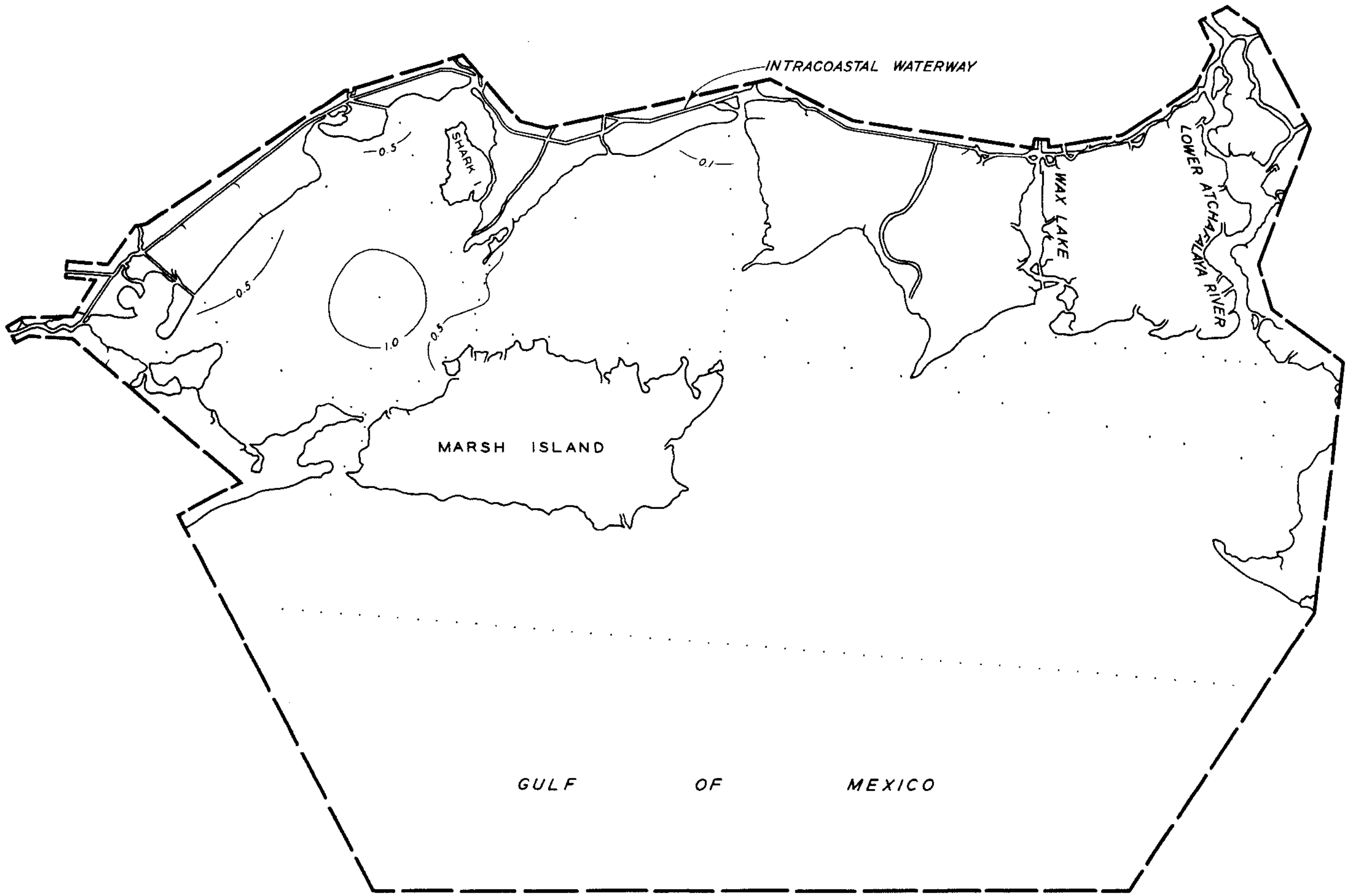
PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT



PROTOTYPE
SALINITY SURVEY
27 APRIL 1955

NOTE: ISOCHLORS IN PARTS PER THOUSAND.



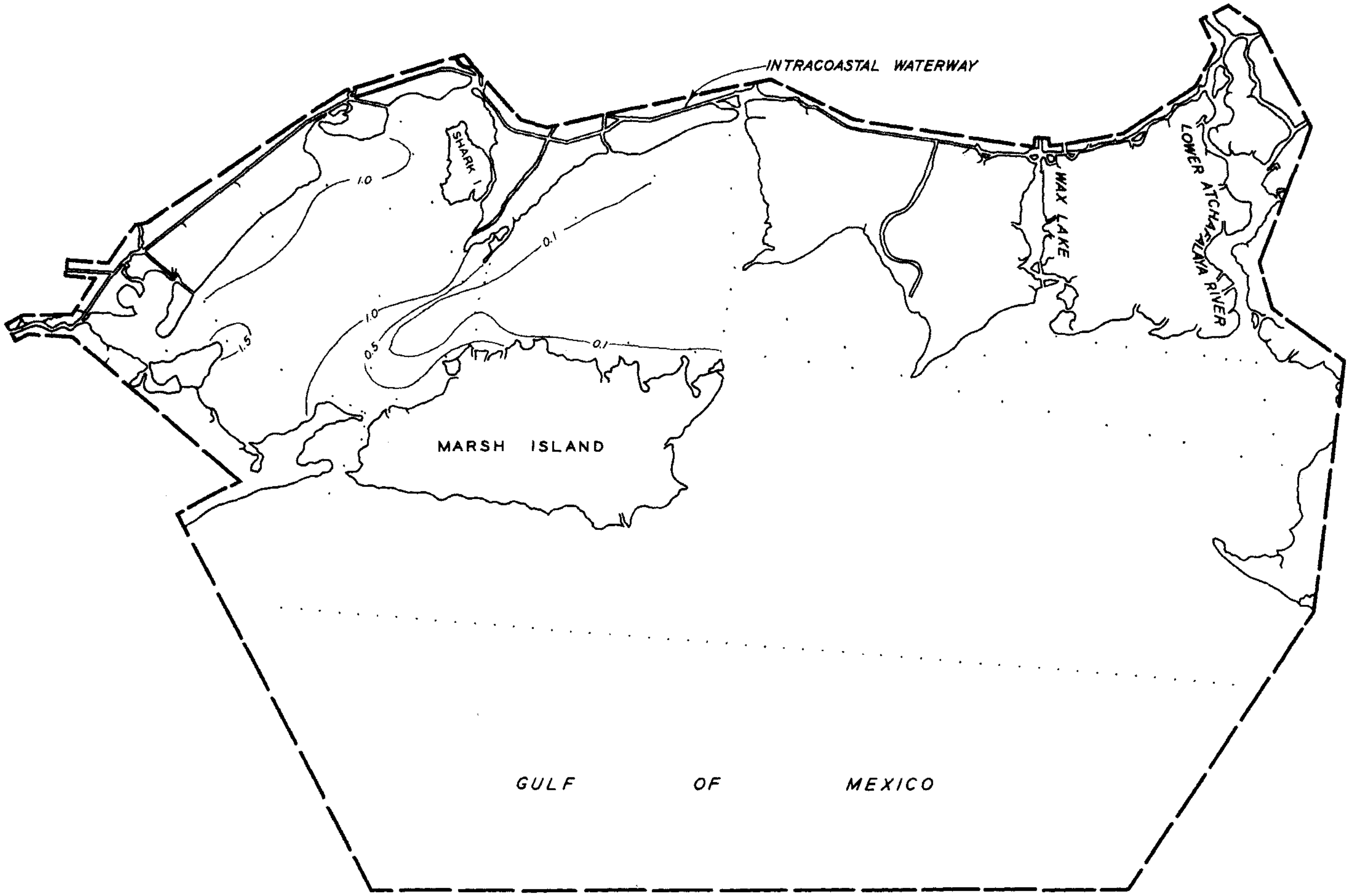
NOTE: ISOCHLORS IN PARTS PER THOUSAND.

MODEL
SALINITY SURVEY
27 APRIL 1955

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT

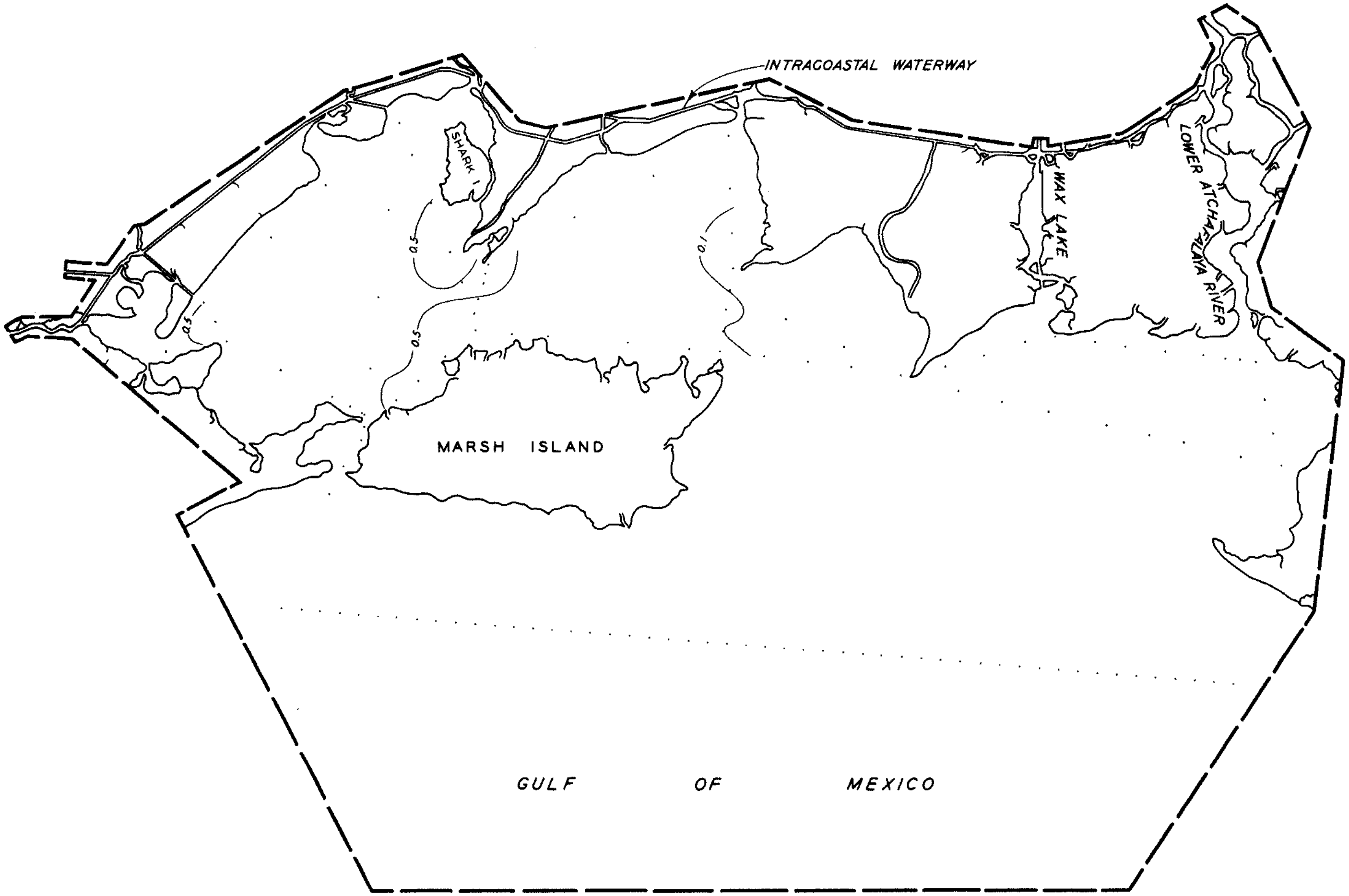


NOTE: ISOCHLORS IN PARTS PER THOUSAND.

PROTOTYPE
SALINITY SURVEY
4 MAY 1955

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT



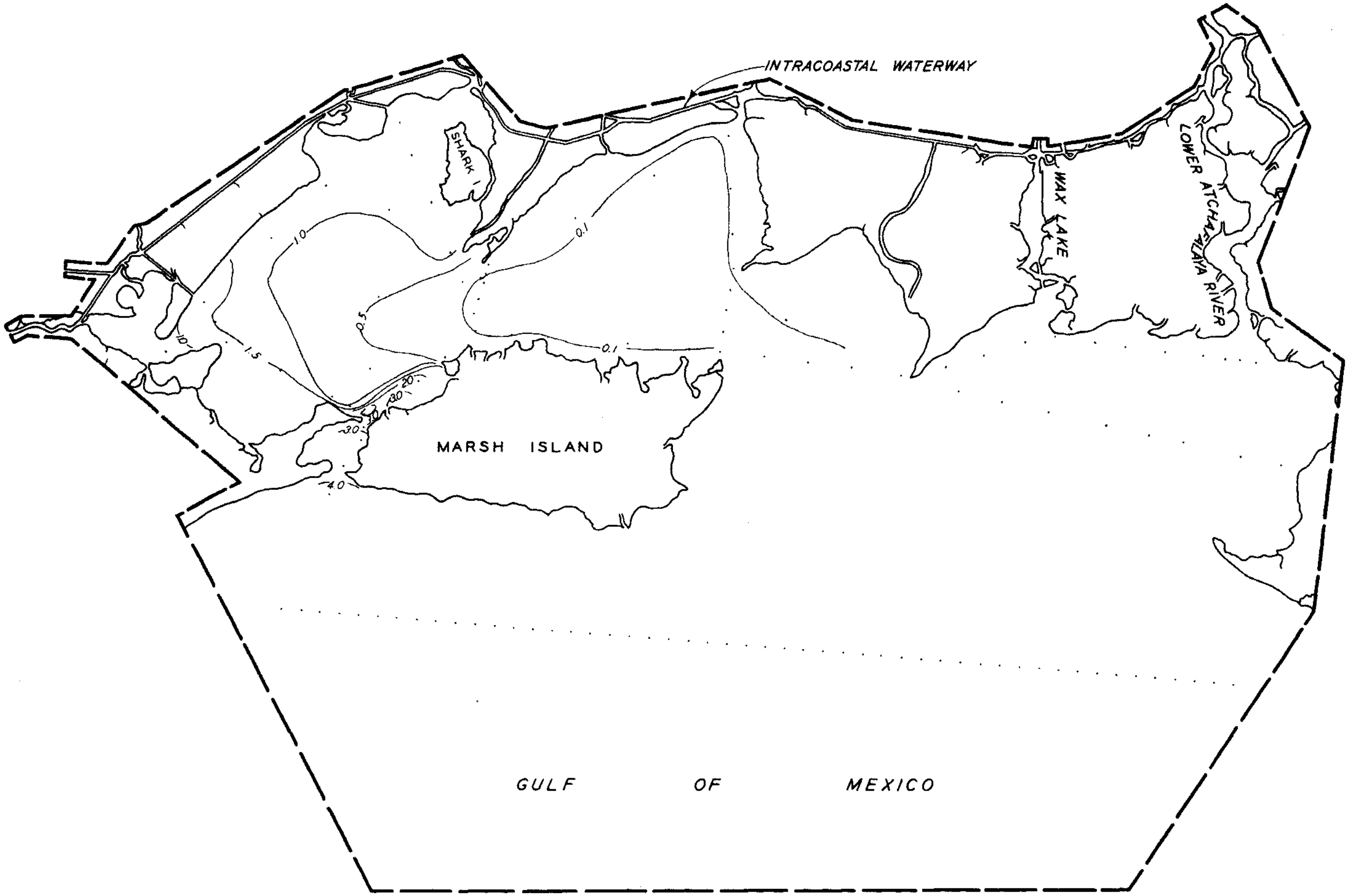
NOTE: ISOCHLORS IN PARTS PER THOUSAND.

MODEL
SALINITY SURVEY
4 MAY 1955

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT

PLATE 21

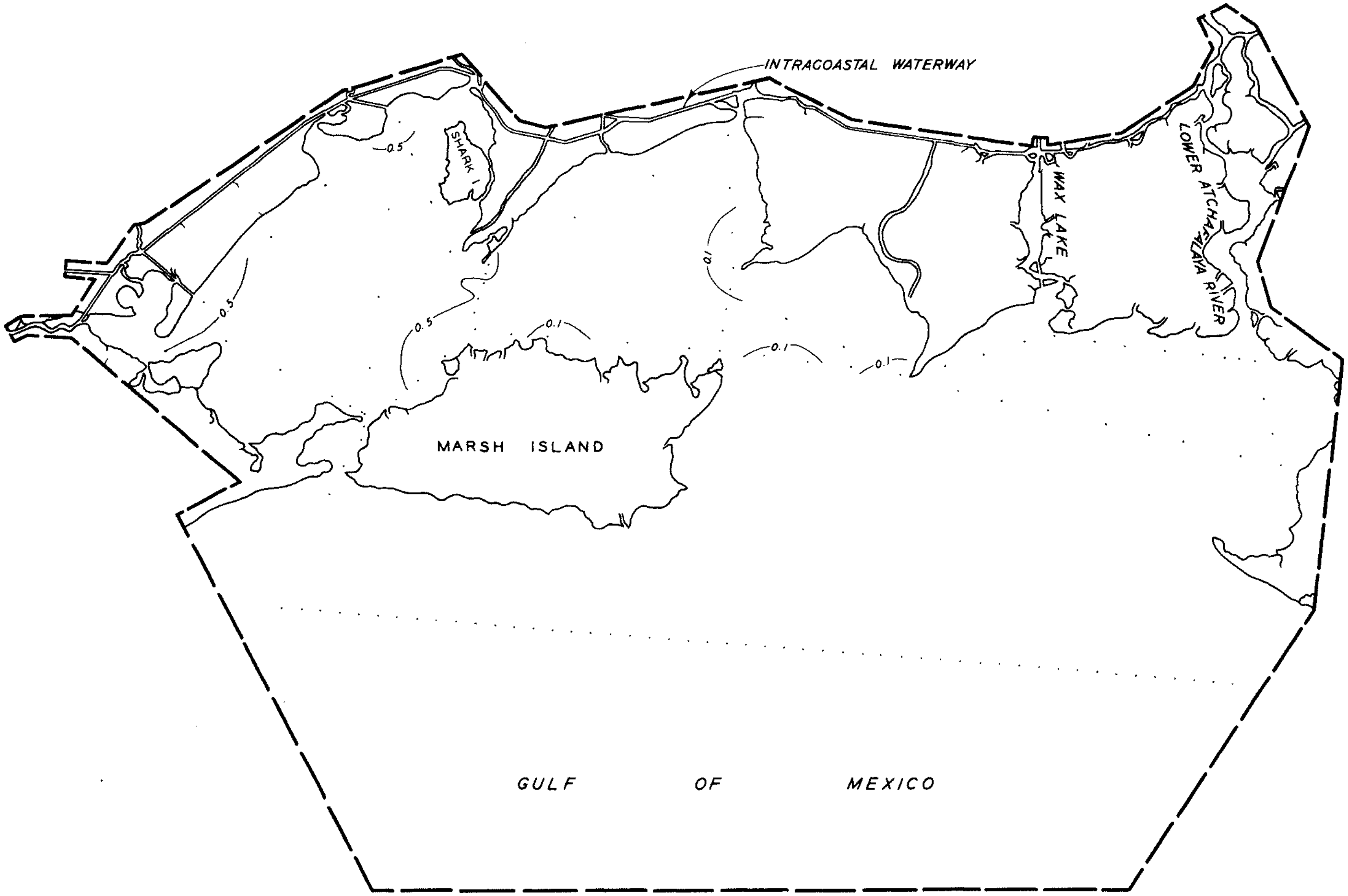


PROTOTYPE
SALINITY SURVEY
10 MAY 1955

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT



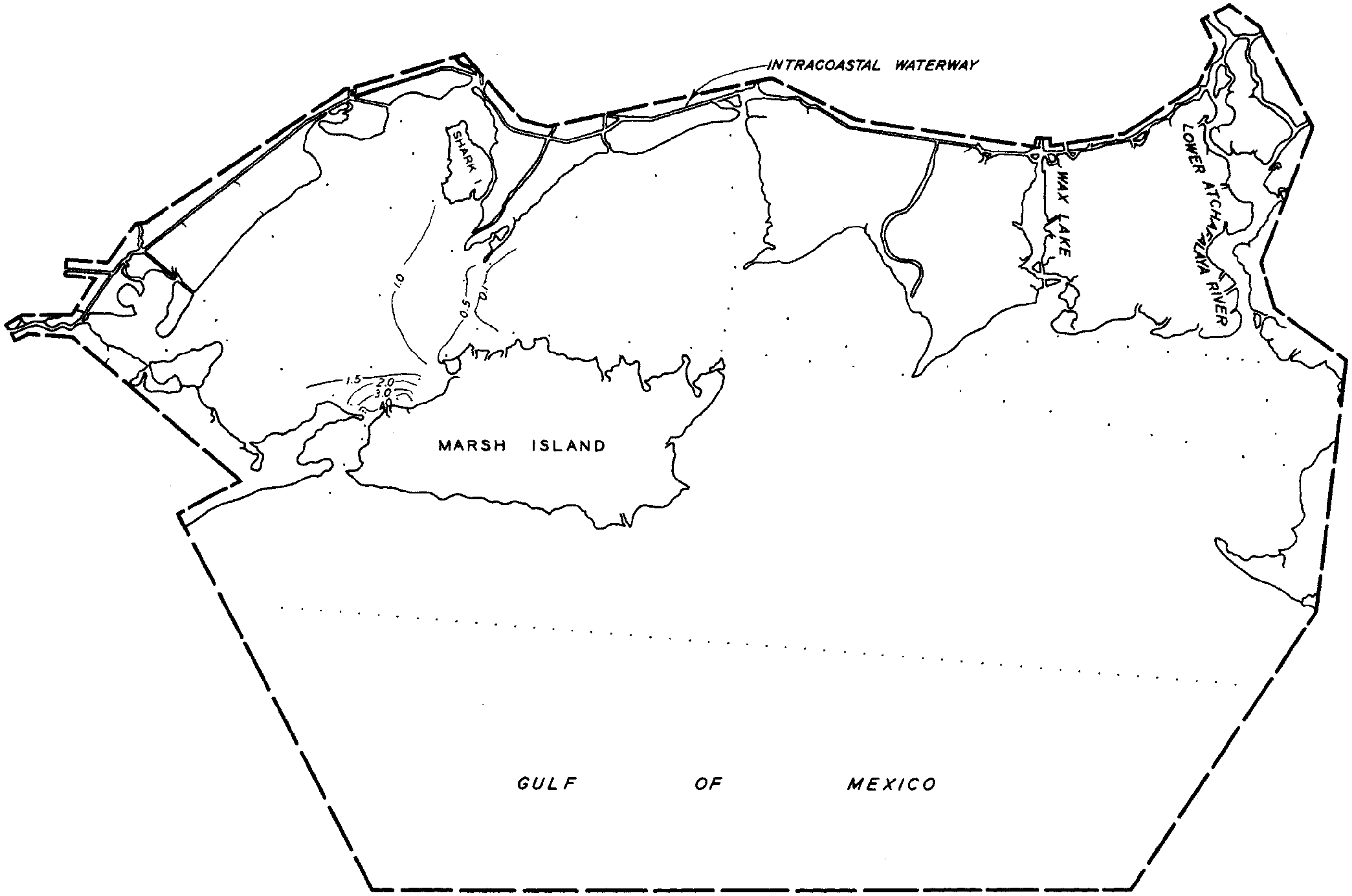
NOTE: ISOCHLORS IN PARTS PER THOUSAND.

MODEL
SALINITY SURVEY
10 MAY 1955

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT

PLATE 23



NOTE: ISOCHLORS IN PARTS PER THOUSAND.

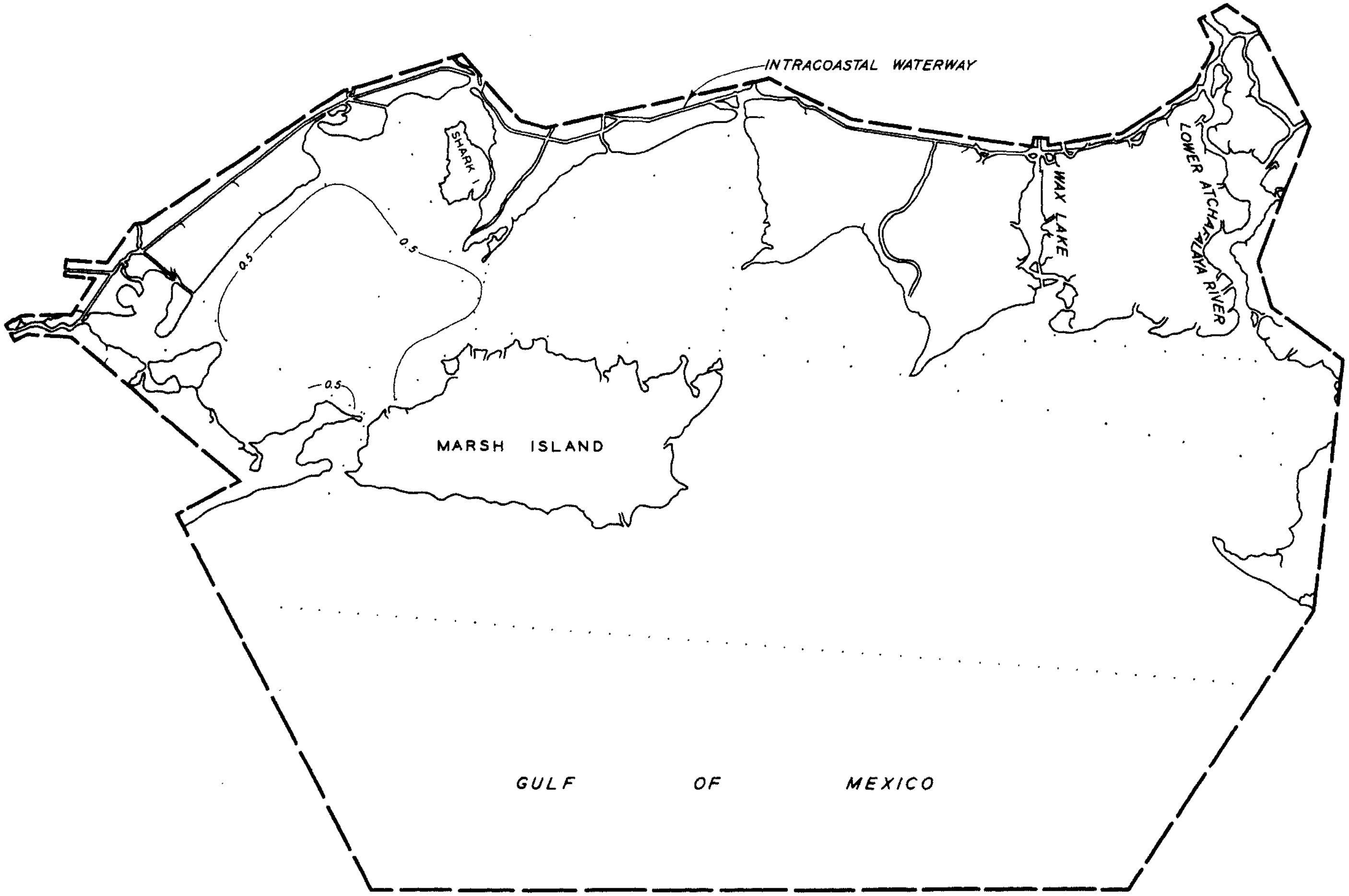
PROTOTYPE SALINITY SURVEY

18 MAY 1955

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT

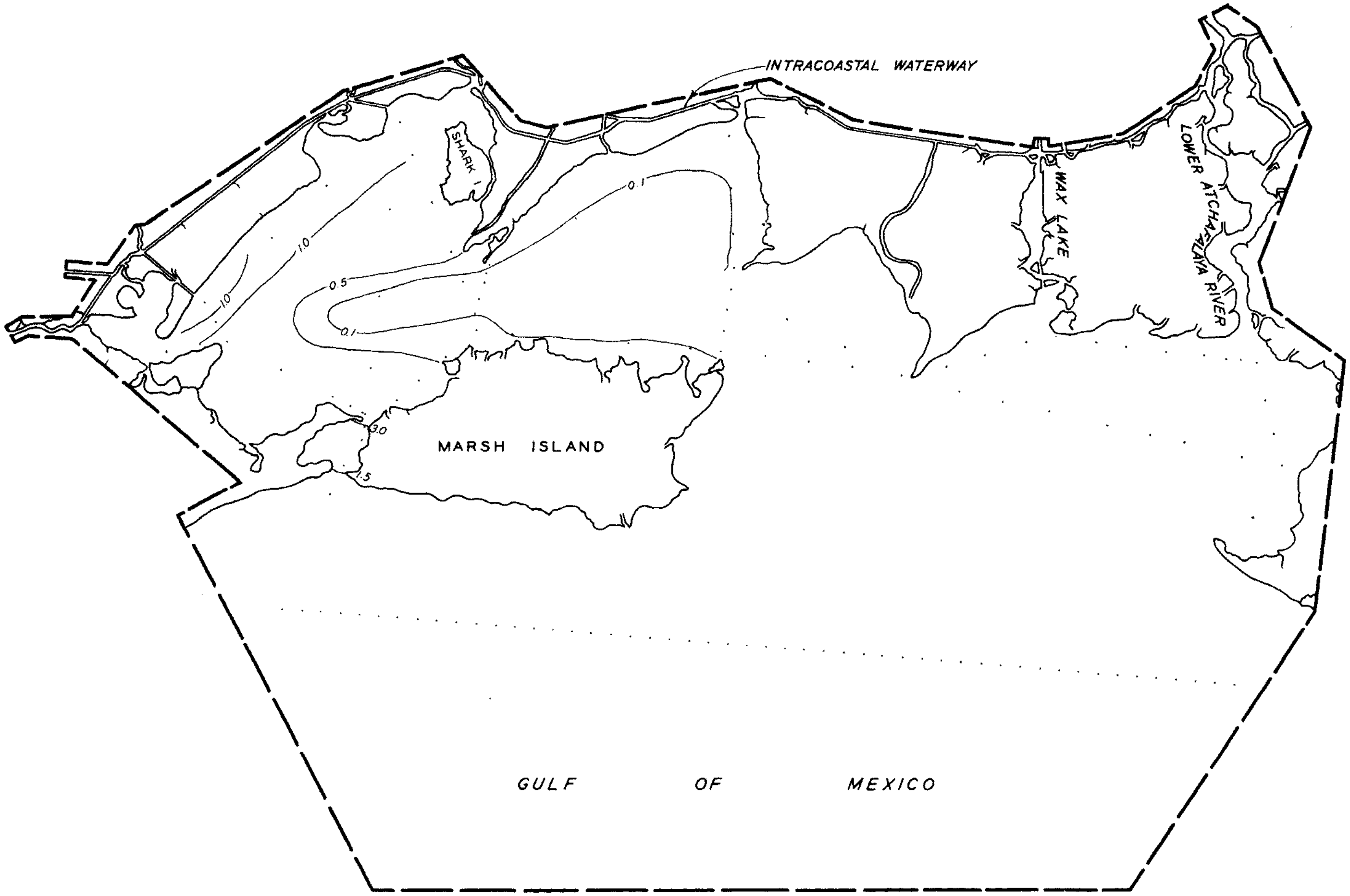


NOTE: ISOCHLORS IN PARTS PER THOUSAND.

MODEL
SALINITY SURVEY
18 MAY 1955

SCALE
PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT

PLATE 25



NOTE: ISOCHLORS IN PARTS PER THOUSAND.

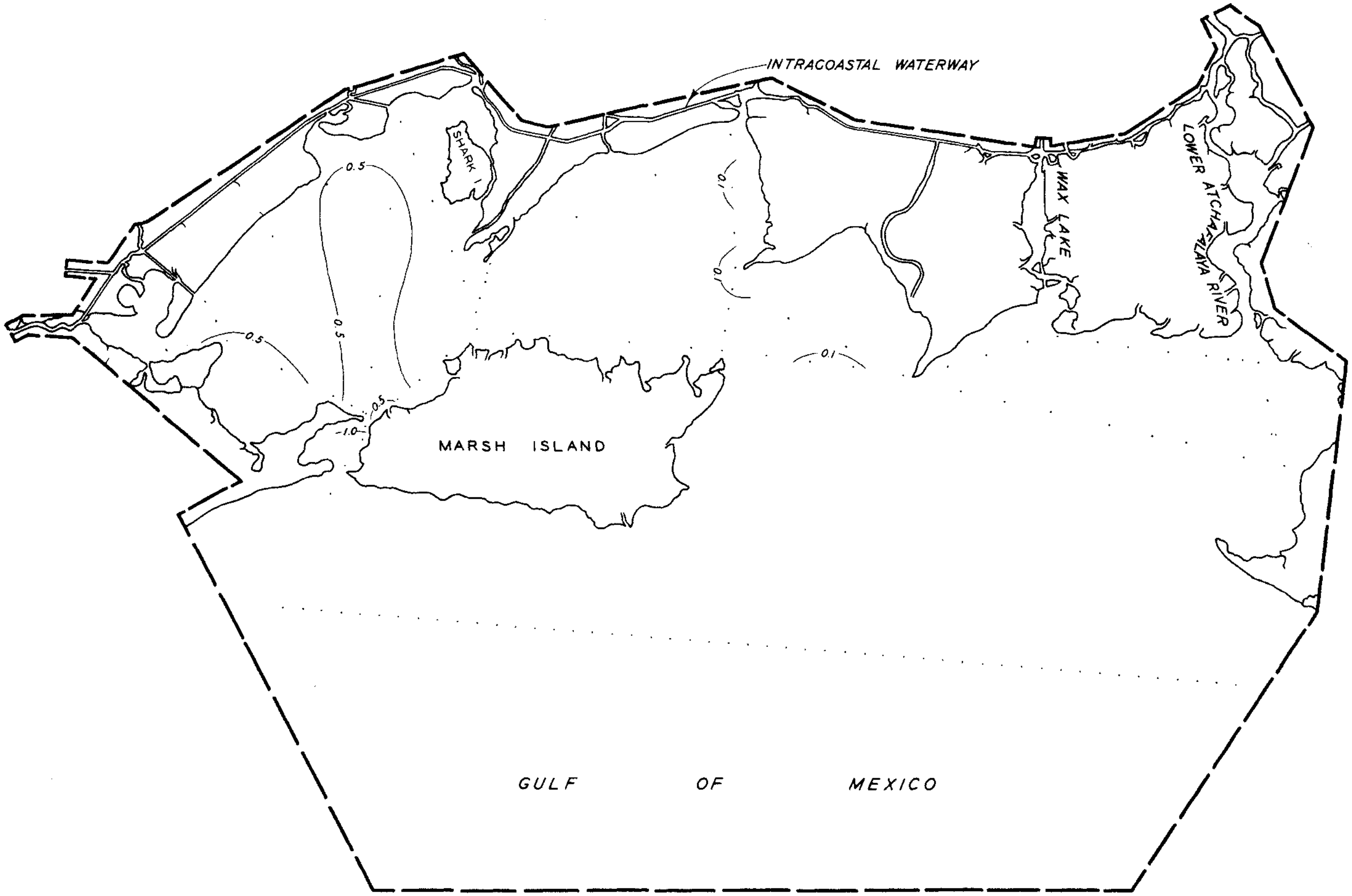
PROTOTYPE SALINITY SURVEY

25 MAY 1955

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT



NOTE: ISOCHLORS IN PARTS PER THOUSAND.

MODEL SALINITY SURVEY

25 MAY 1955

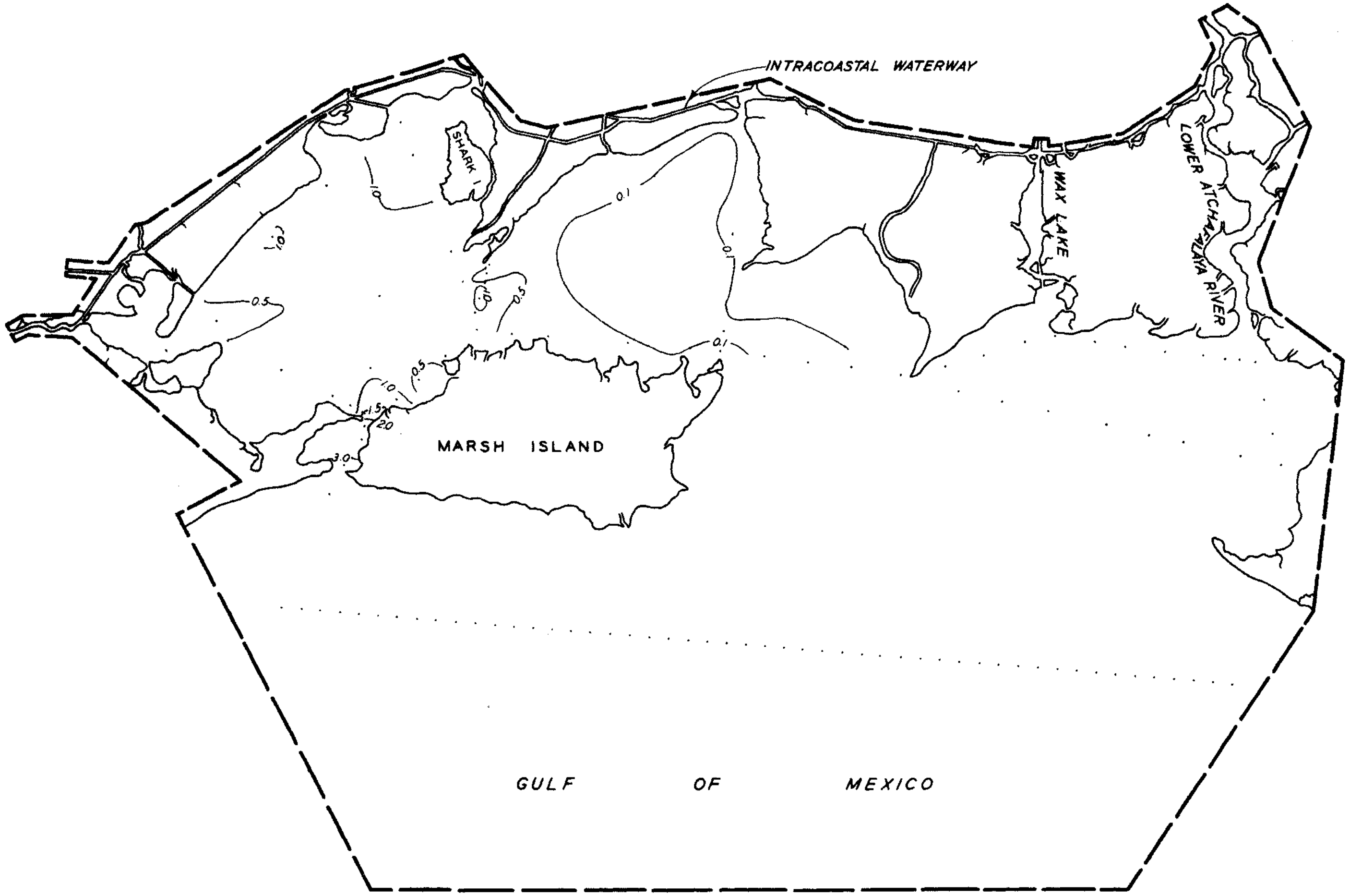
SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT

PLATE 27

PLATE 28

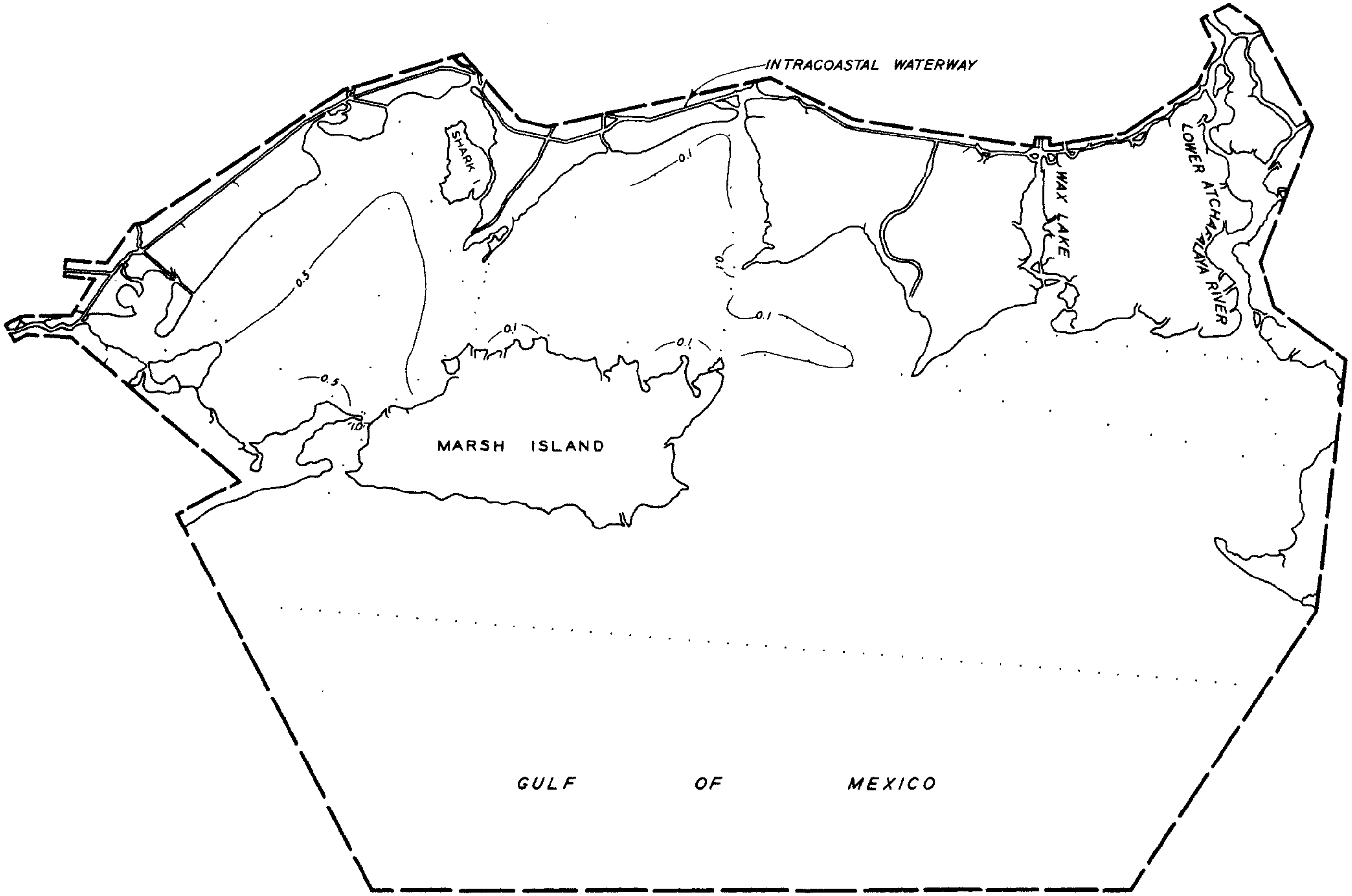


PROTOTYPE
SALINITY SURVEY
31 MAY 1955

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT



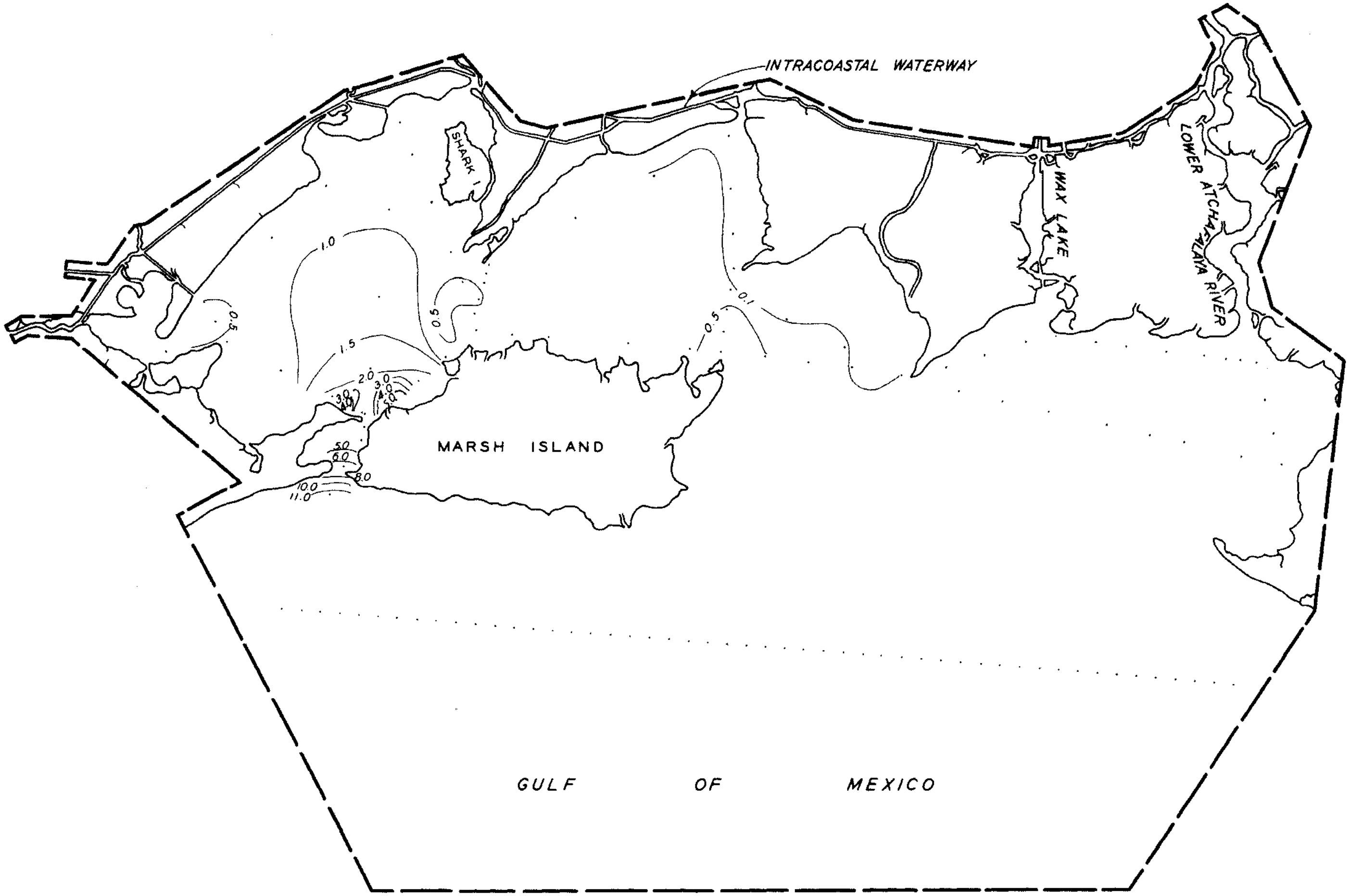
NOTE: ISOCHLORS IN PARTS PER THOUSAND.

MODEL SALINITY SURVEY

31 MAY 1955

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT



PROTOTYPE SALINITY SURVEY

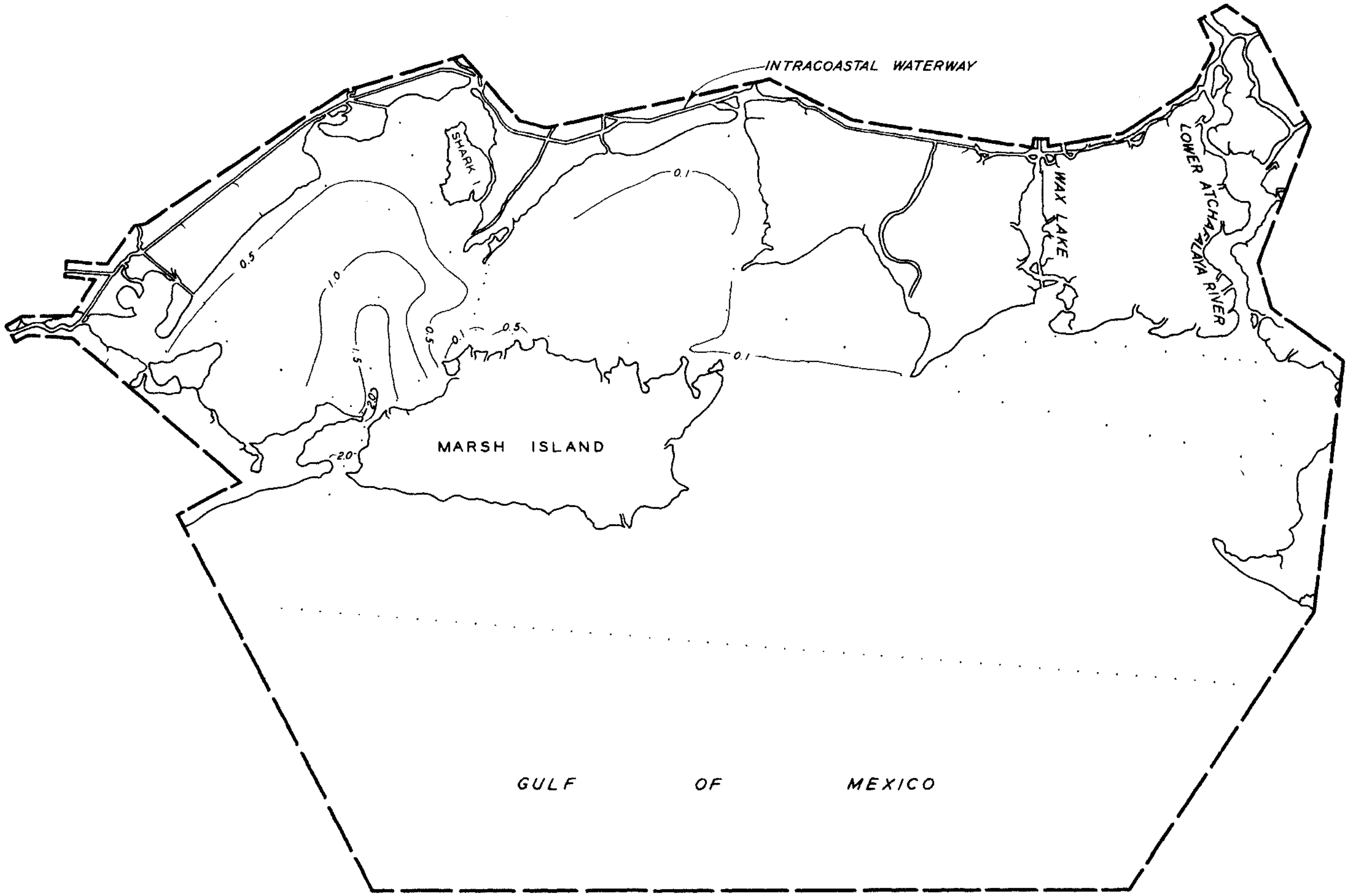
9 JUNE 1955

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT



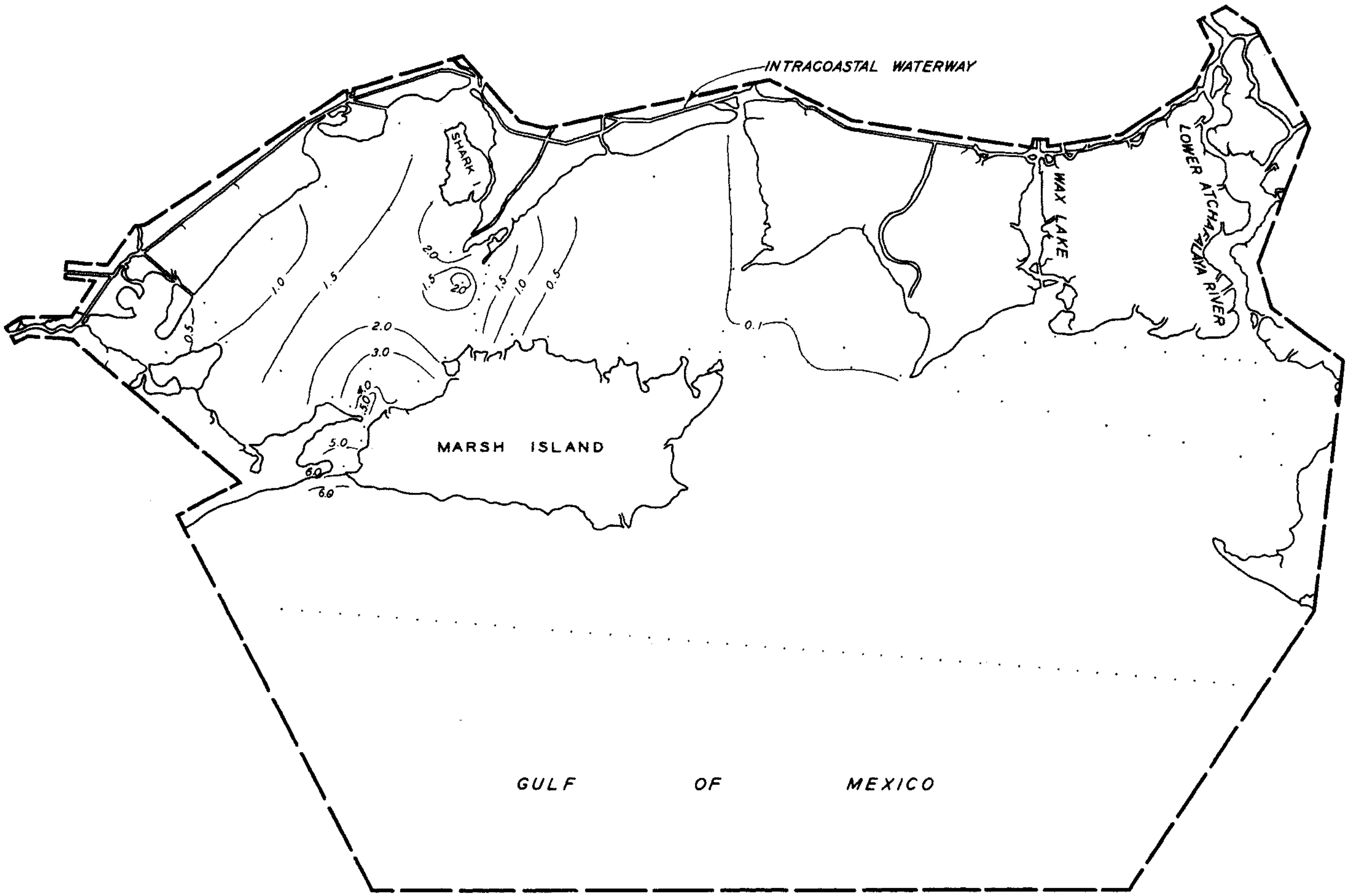
NOTE: ISOCHLORS IN PARTS PER THOUSAND.

MODEL
SALINITY SURVEY
9 JUNE 1955

SCALE
PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT

PLATE 31

PLATE 32

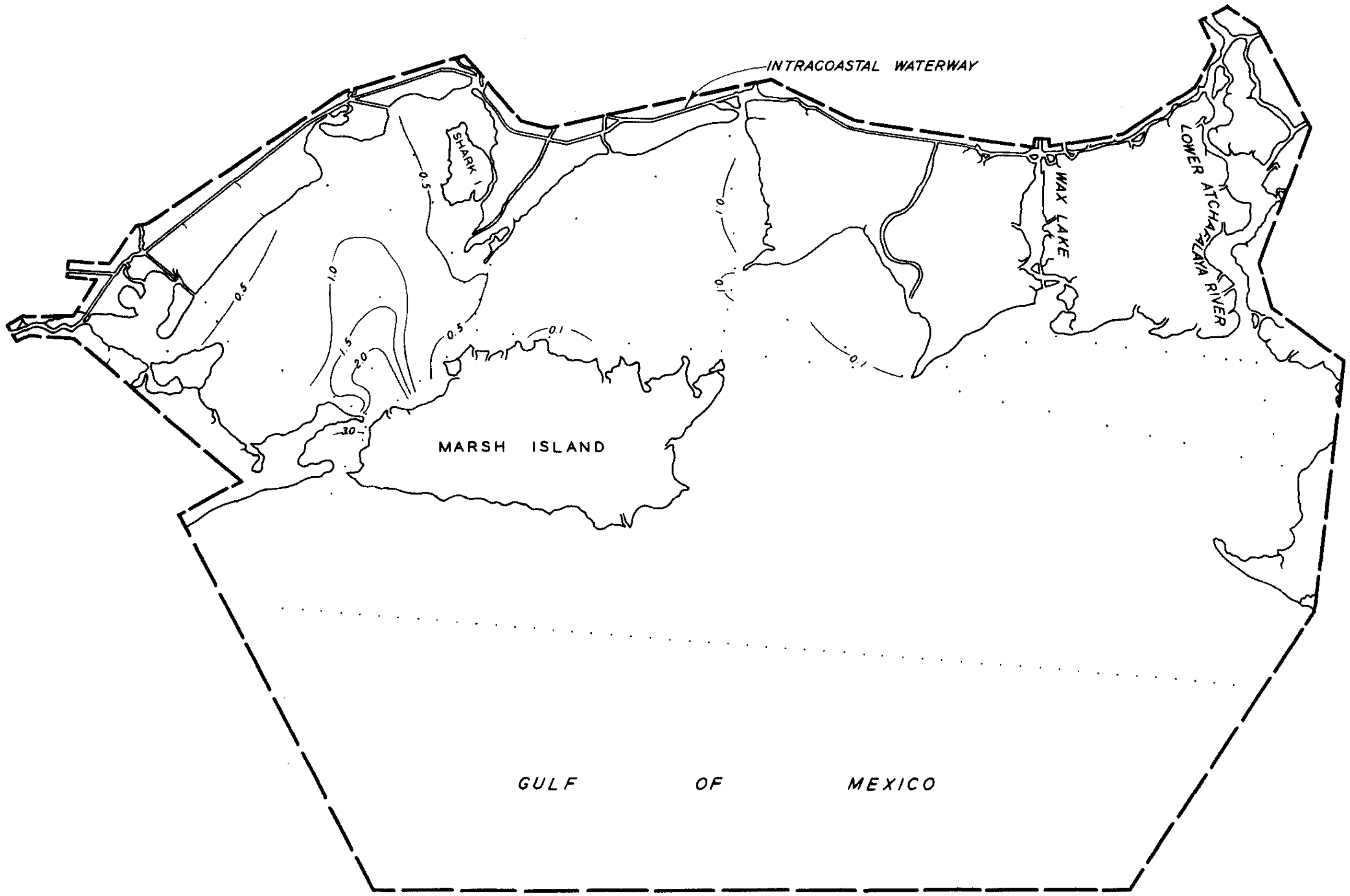


NOTE: ISOCHLORS IN PARTS PER THOUSAND.

PROTOTYPE
SALINITY SURVEY
20 JUNE 1955

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT



MODEL SALINITY SURVEY

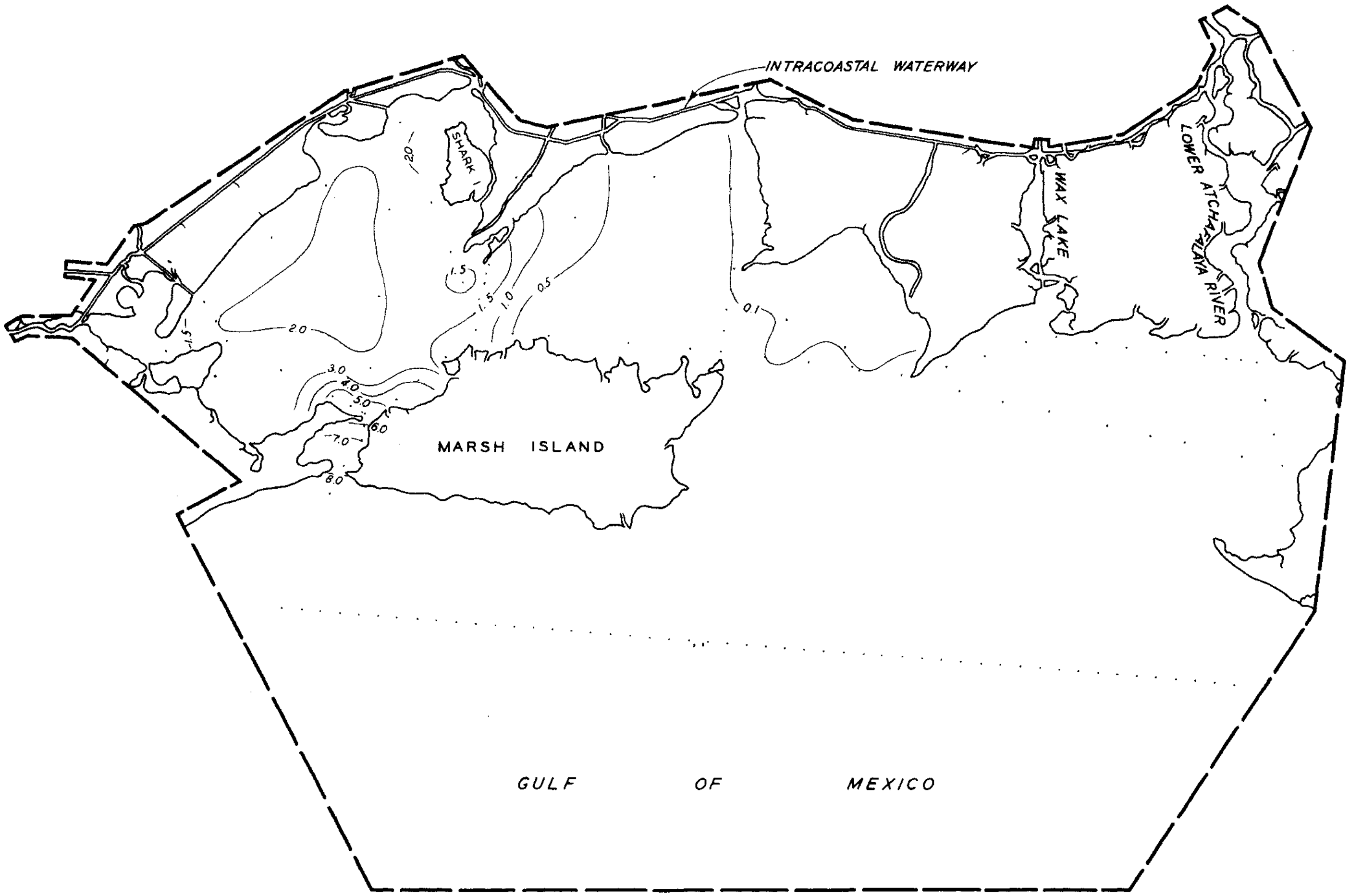
20 JUNE 1955

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT

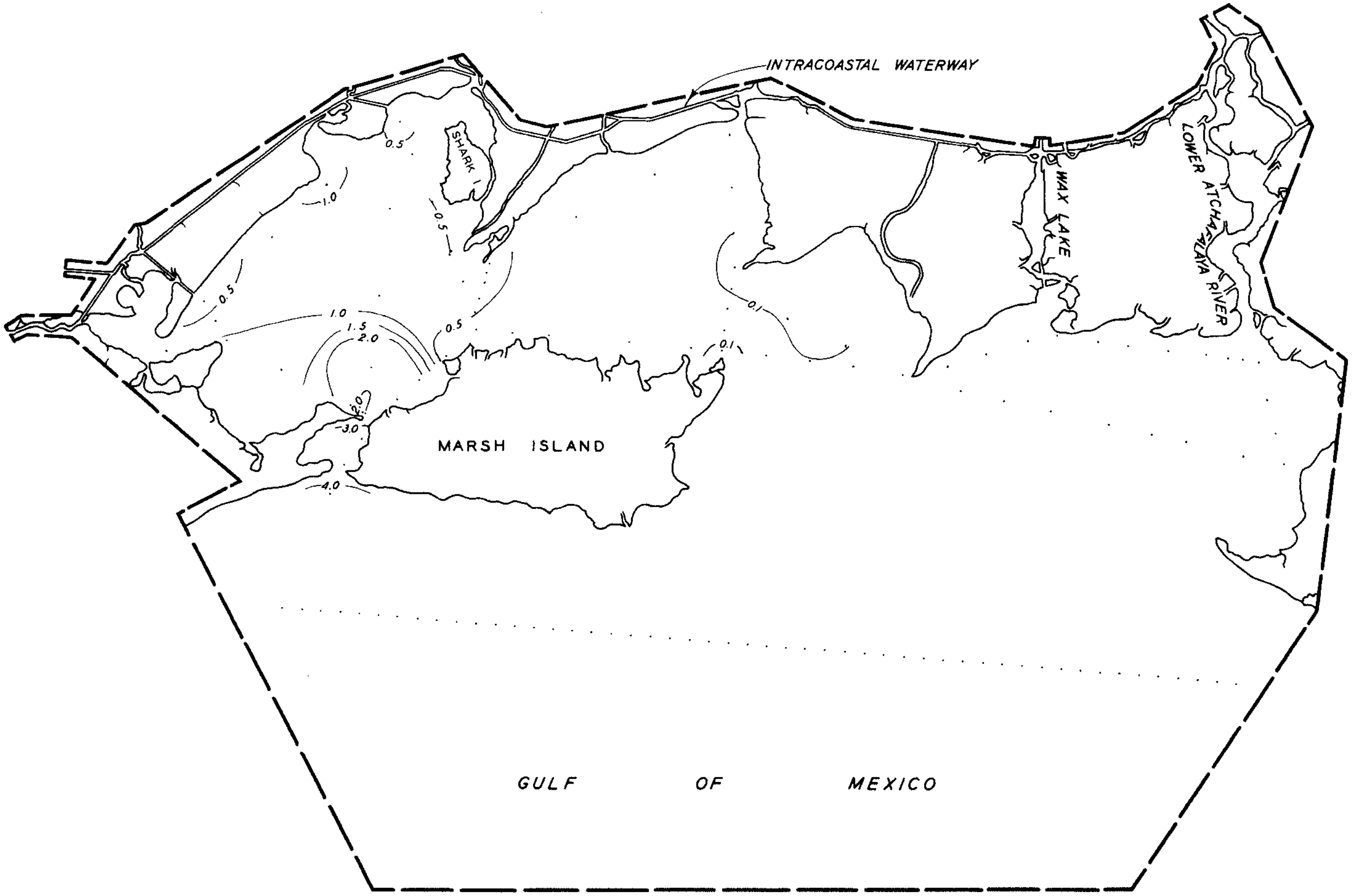


NOTE: ISOCHLORS IN PARTS PER THOUSAND.

PROTOTYPE
SALINITY SURVEY
28 JUNE 1955

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT



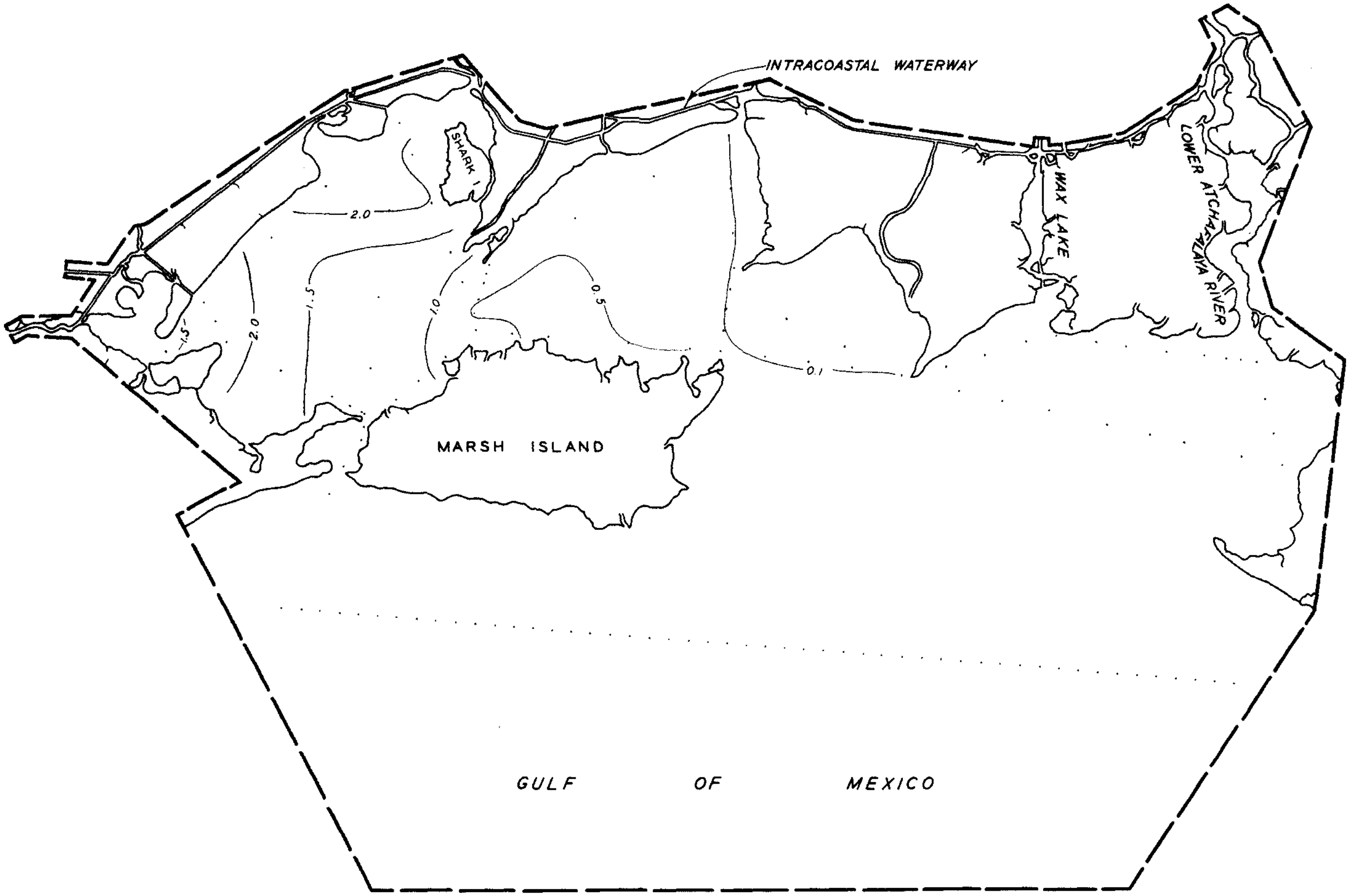
MODEL
SALINITY SURVEY
28 JUNE 1955

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT

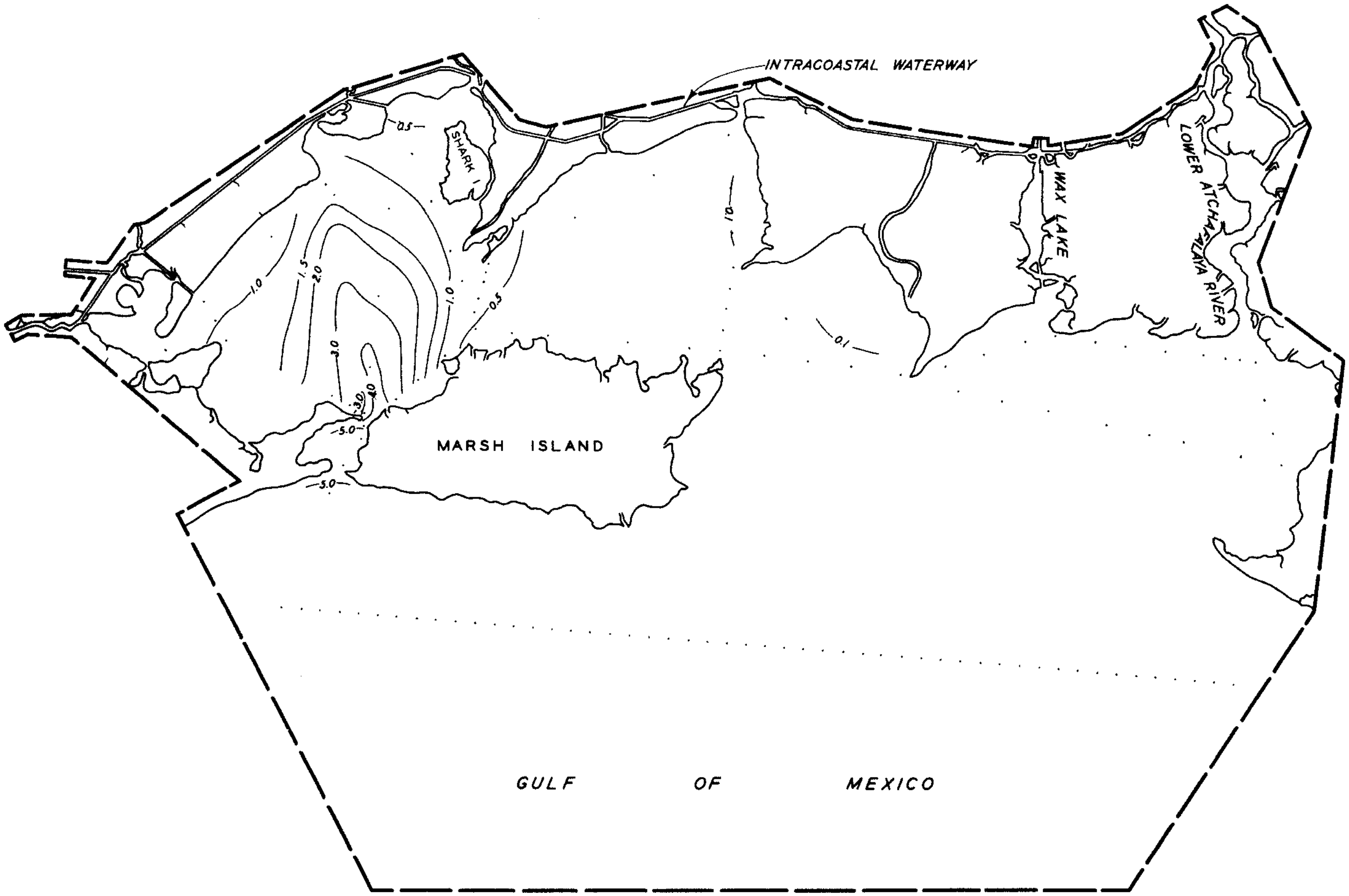


NOTE: ISOCHLORS IN PARTS PER THOUSAND.

PROTOTYPE
SALINITY SURVEY
8 JULY 1955

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT



NOTE: ISOCHLORS IN PARTS PER THOUSAND.

MODEL SALINITY SURVEY

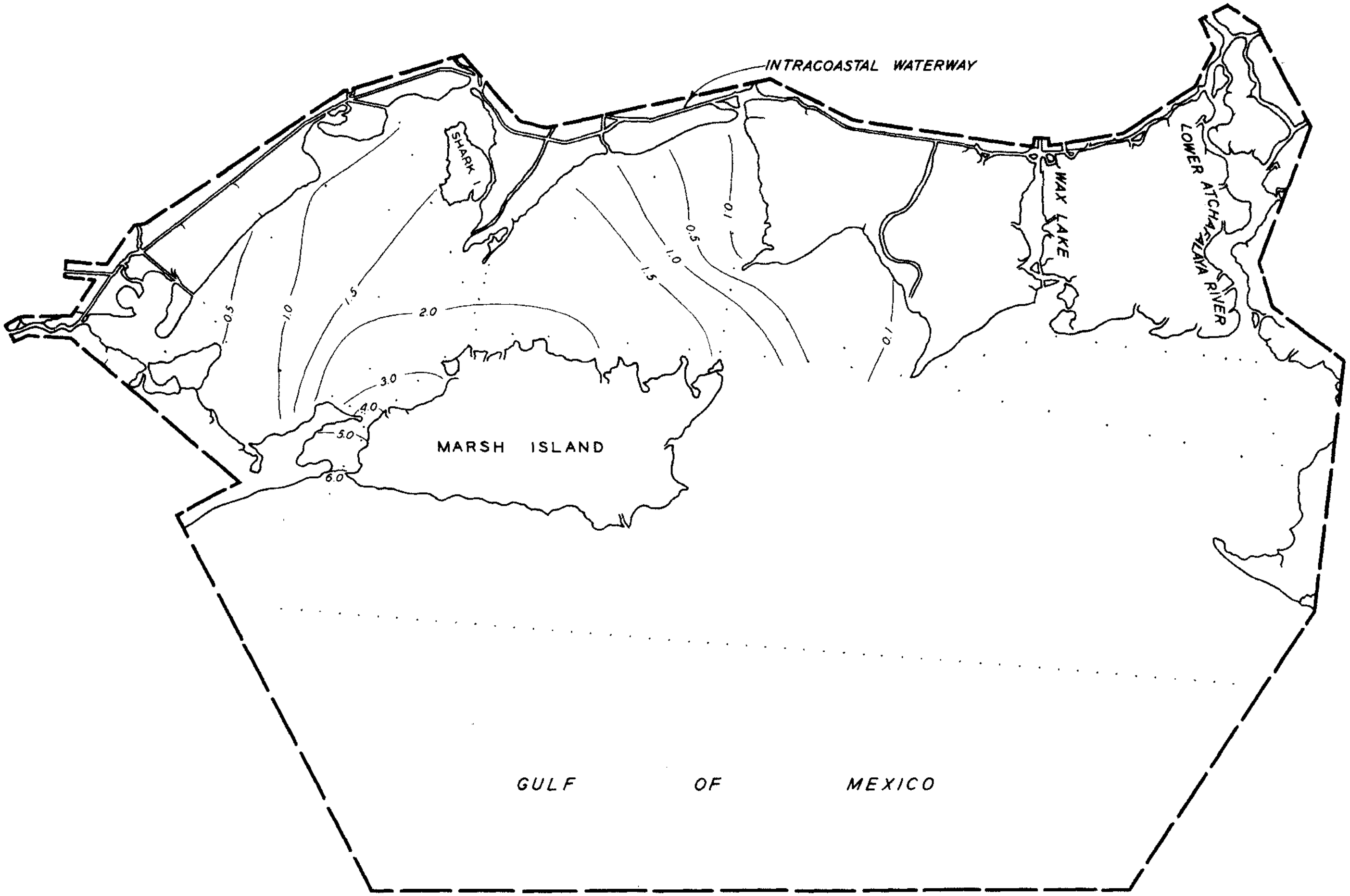
8 JULY 1955

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT

PLATE 38

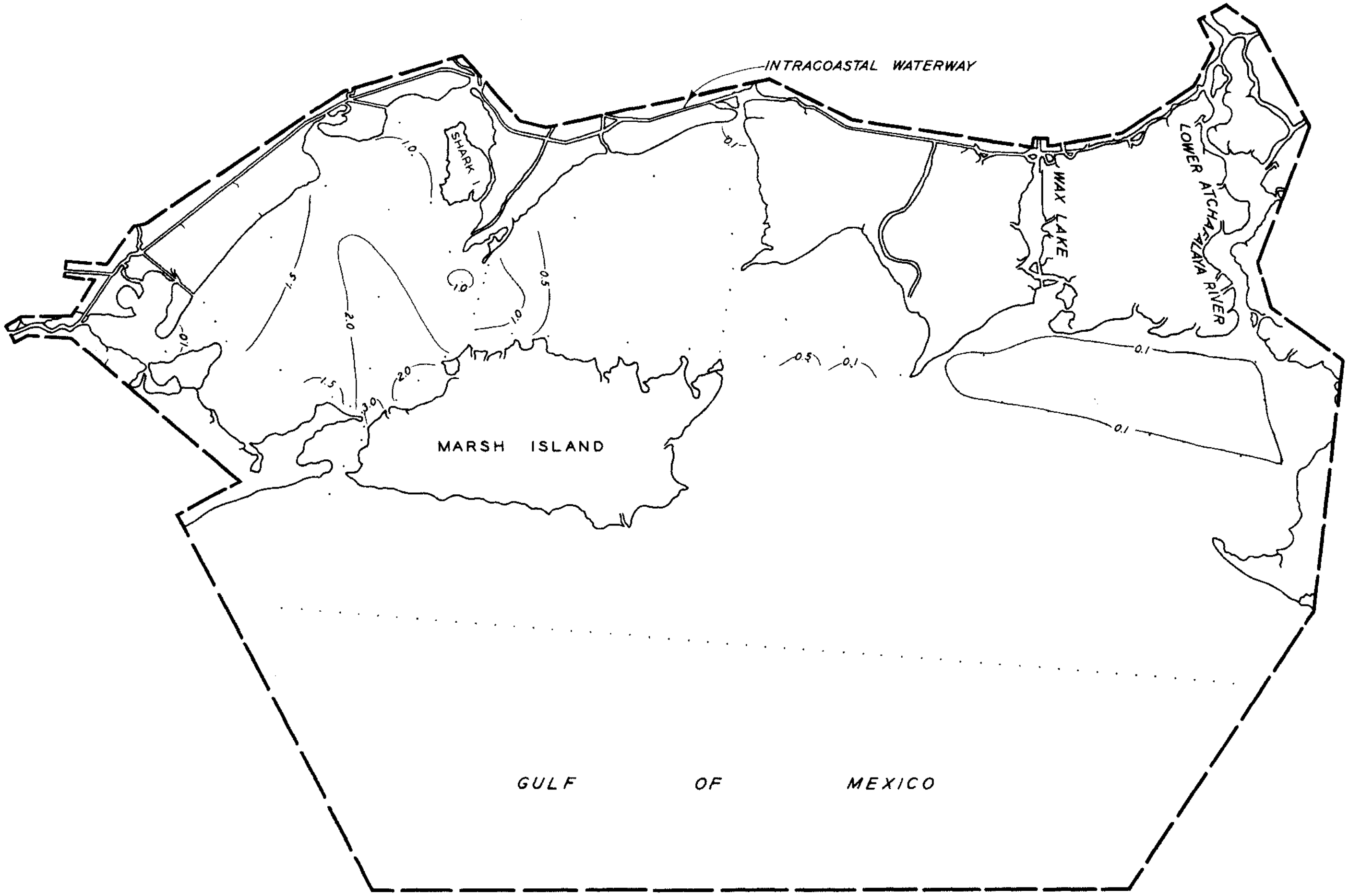


PROTOTYPE
SALINITY SURVEY
16 AUGUST 1955

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT



NOTE: ISOCHLORS IN PARTS PER THOUSAND.

MODEL SALINITY SURVEY

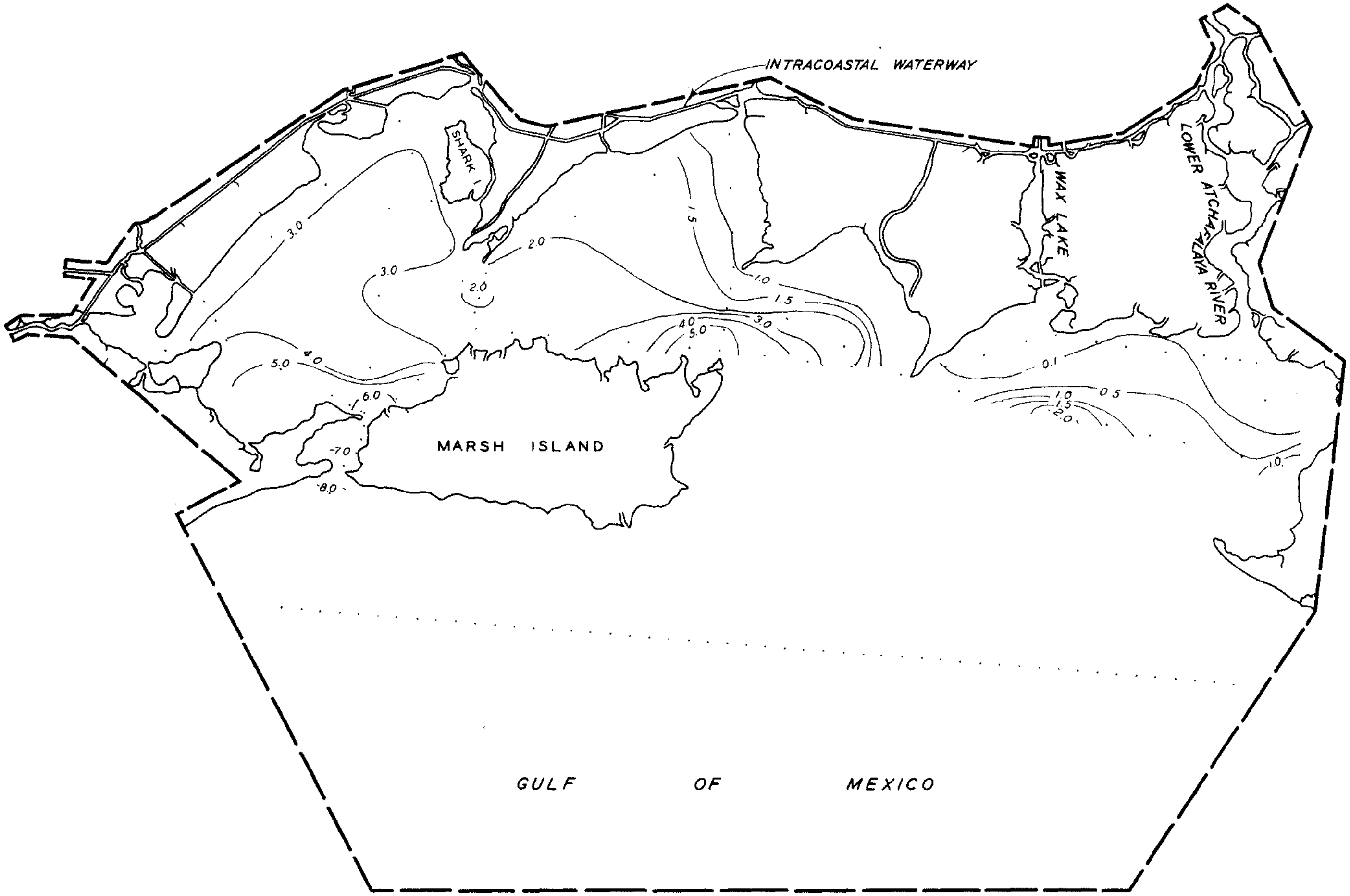
16 AUGUST 1955

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT

PLATE 40



PROTOTYPE SALINITY SURVEY

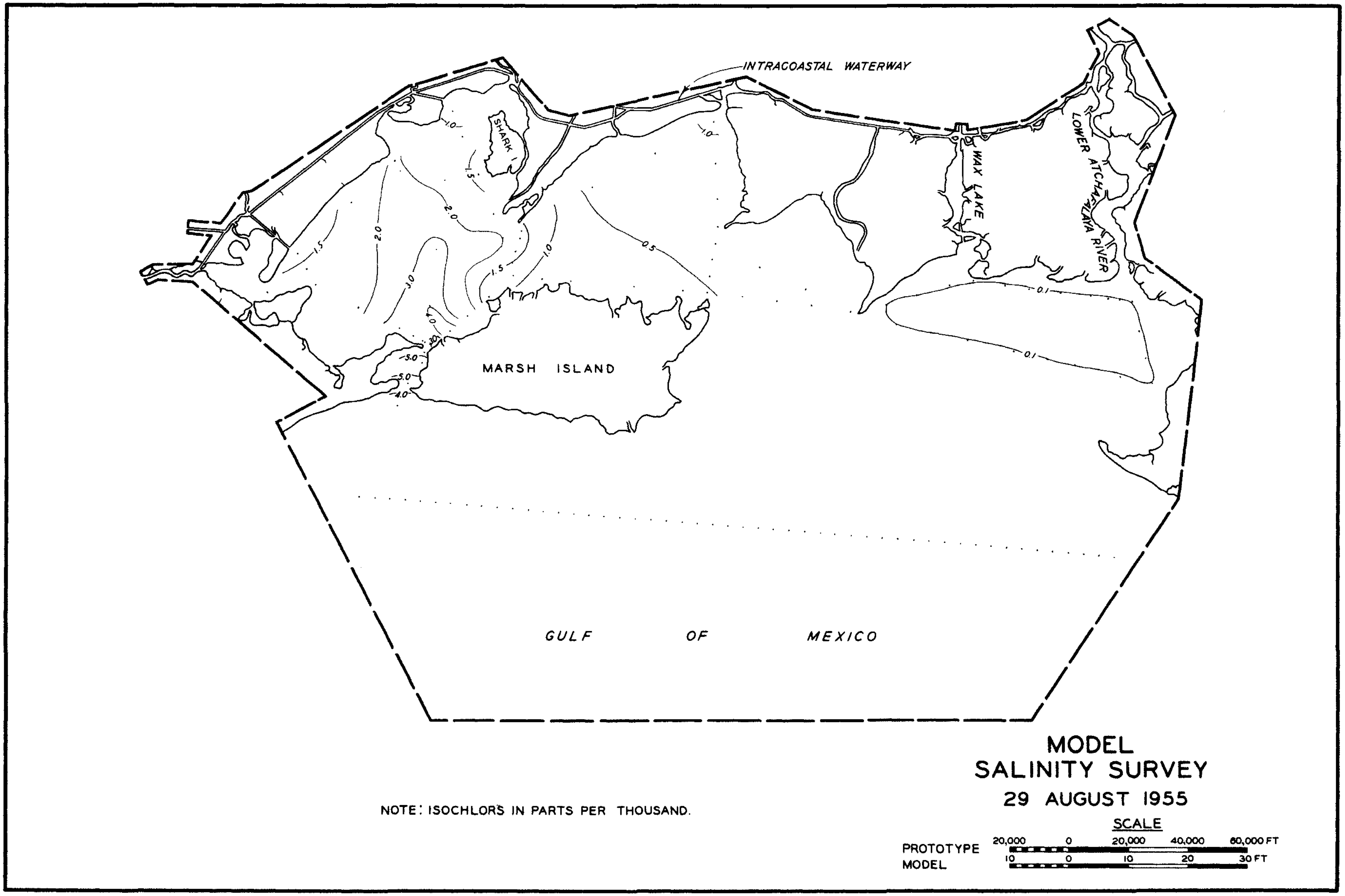
29 AUGUST 1955

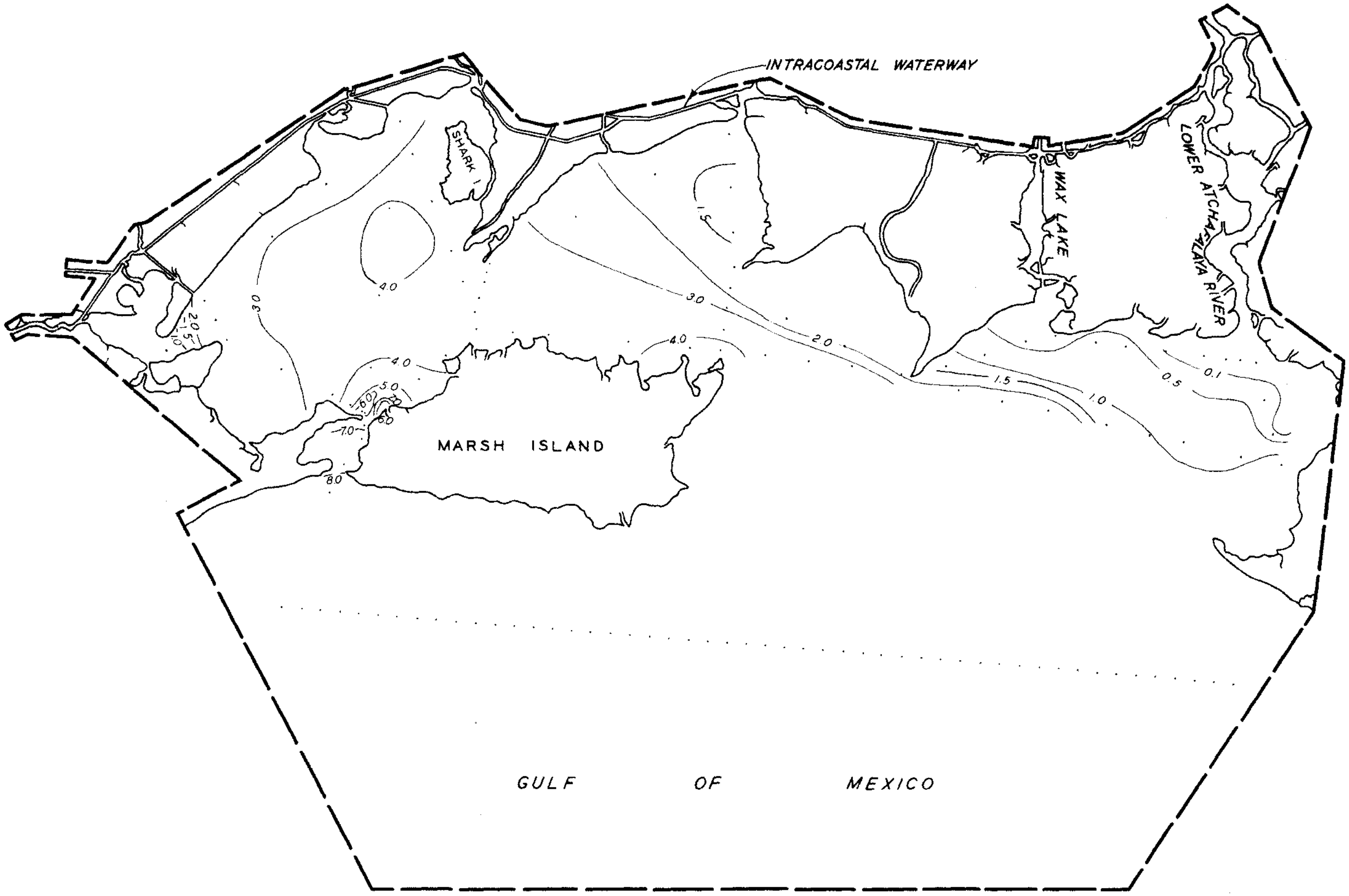
NOTE: ISOCHLORS IN PARTS PER THOUSAND.

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT


INTRACOASTAL WATERWAY
SHARK I
WAX LAKE
LOWER ATCHAFALAYA RIVER
MARSH ISLAND
GULF OF MEXICO
1.0
1.5
2.0
3.0
4.0
5.0
0.5
0.1
MODEL
SALINITY SURVEY
29 AUGUST 1955
NOTE: ISOCHLORS IN PARTS PER THOUSAND.
SCALE
PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT



NOTE: ISOCHLORS IN PARTS PER THOUSAND.

PROTOTYPE
SALINITY SURVEY
9 SEPTEMBER 1955

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT

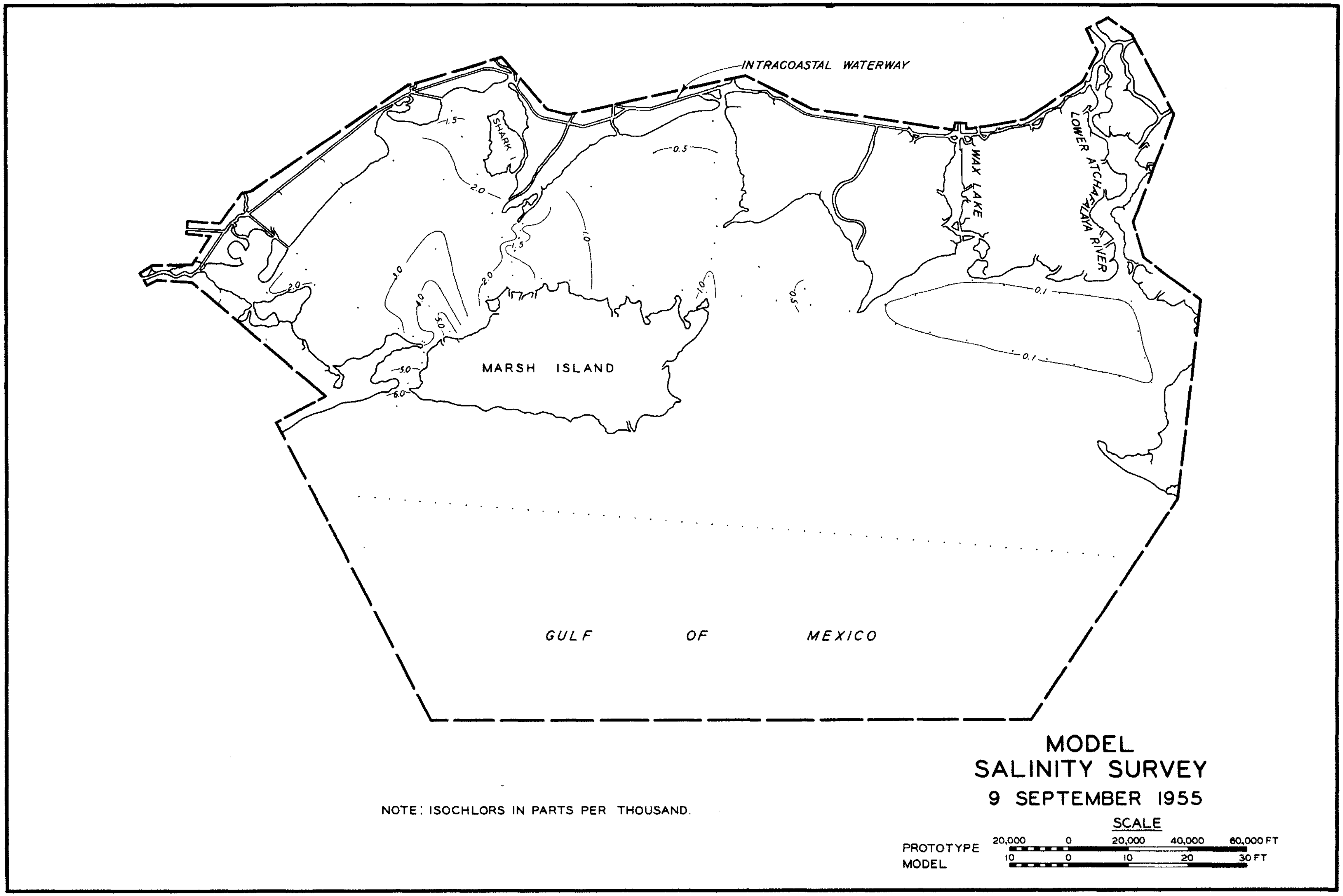
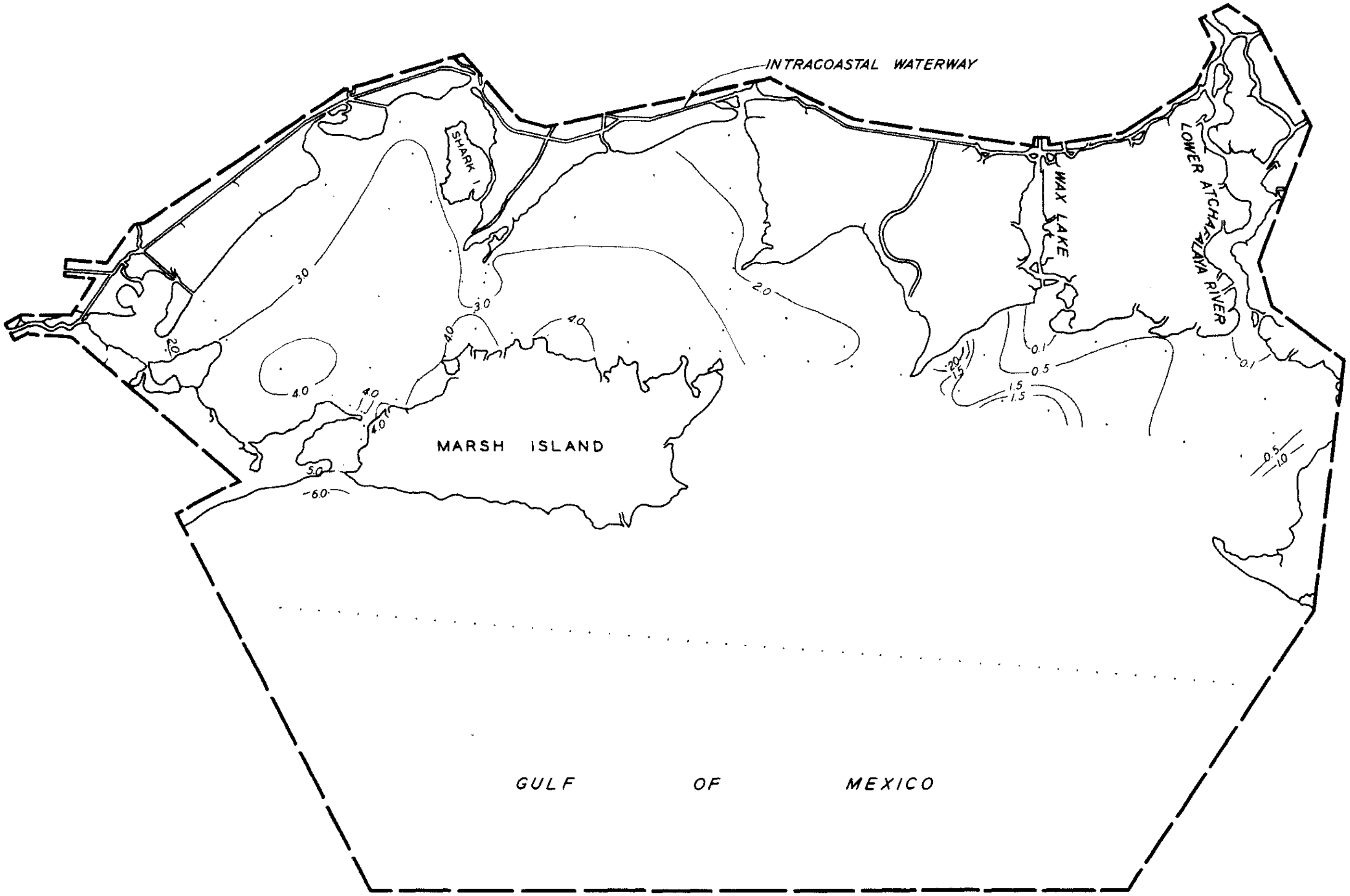

INTRACOASTAL WATERWAY
SHARK I.
WAX LAKE
LOWER ATCHAFALAYA RIVER
MARSH ISLAND
GULF OF MEXICO
1.5
2.0
0.5
1.0
3.0
4.0
5.0
6.0
0.1
MODEL
SALINITY SURVEY
9 SEPTEMBER 1955
SCALE
PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT
NOTE: ISOCHLORS IN PARTS PER THOUSAND.

PLATE 43



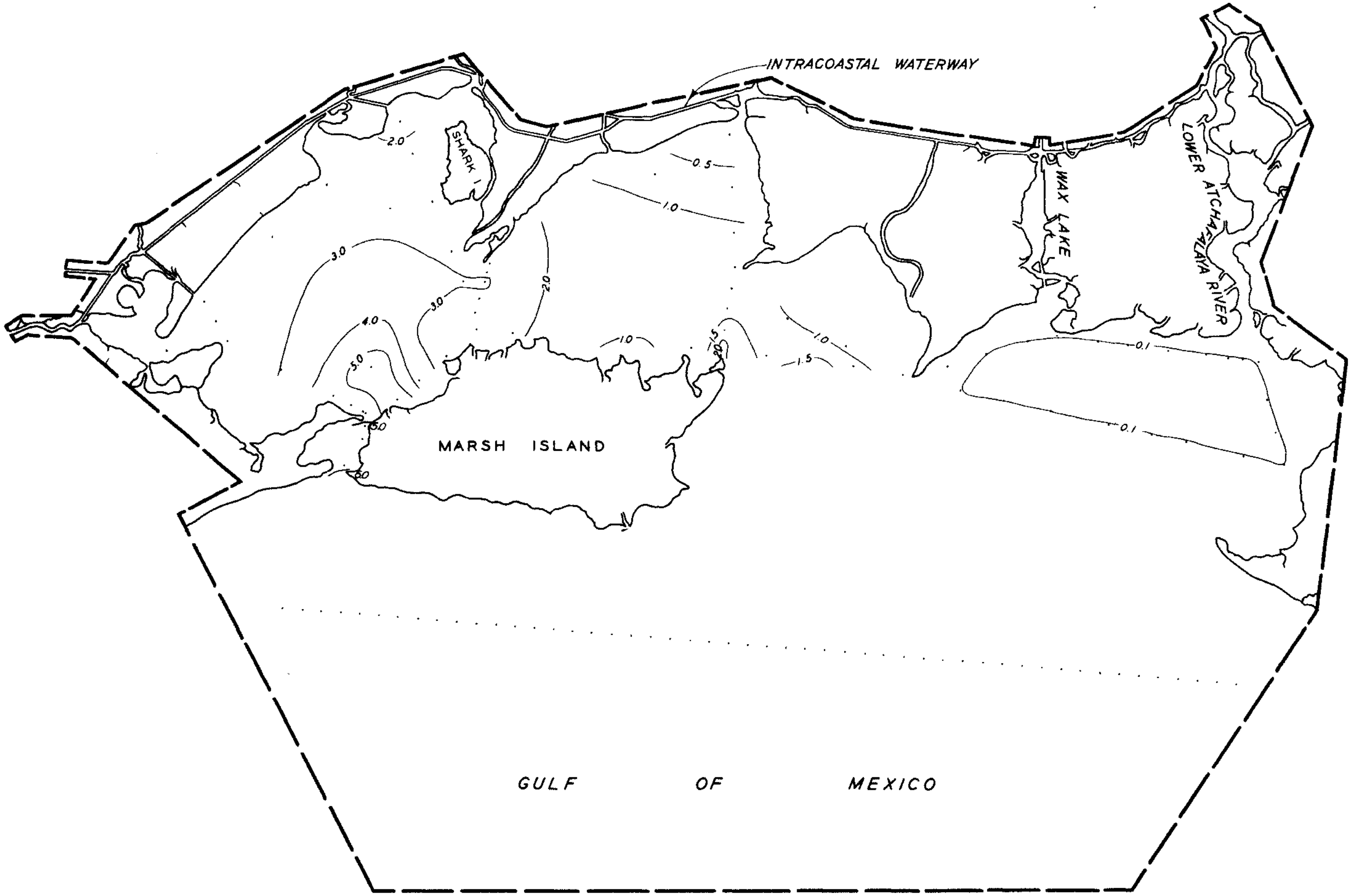
PROTOTYPE SALINITY SURVEY
19 SEPTEMBER 1955

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT

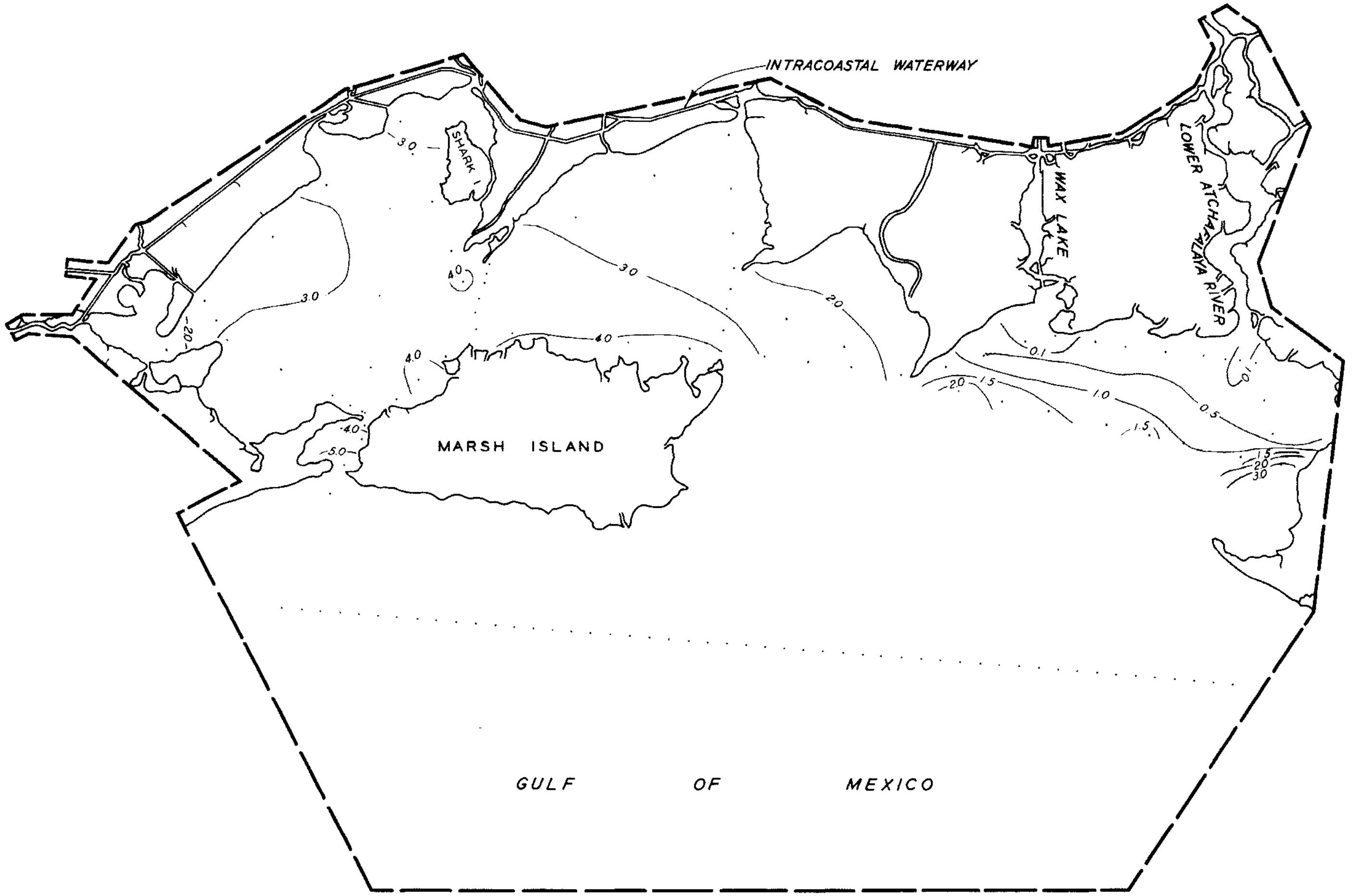


MODEL SALINITY SURVEY
19 SEPTEMBER 1955

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT



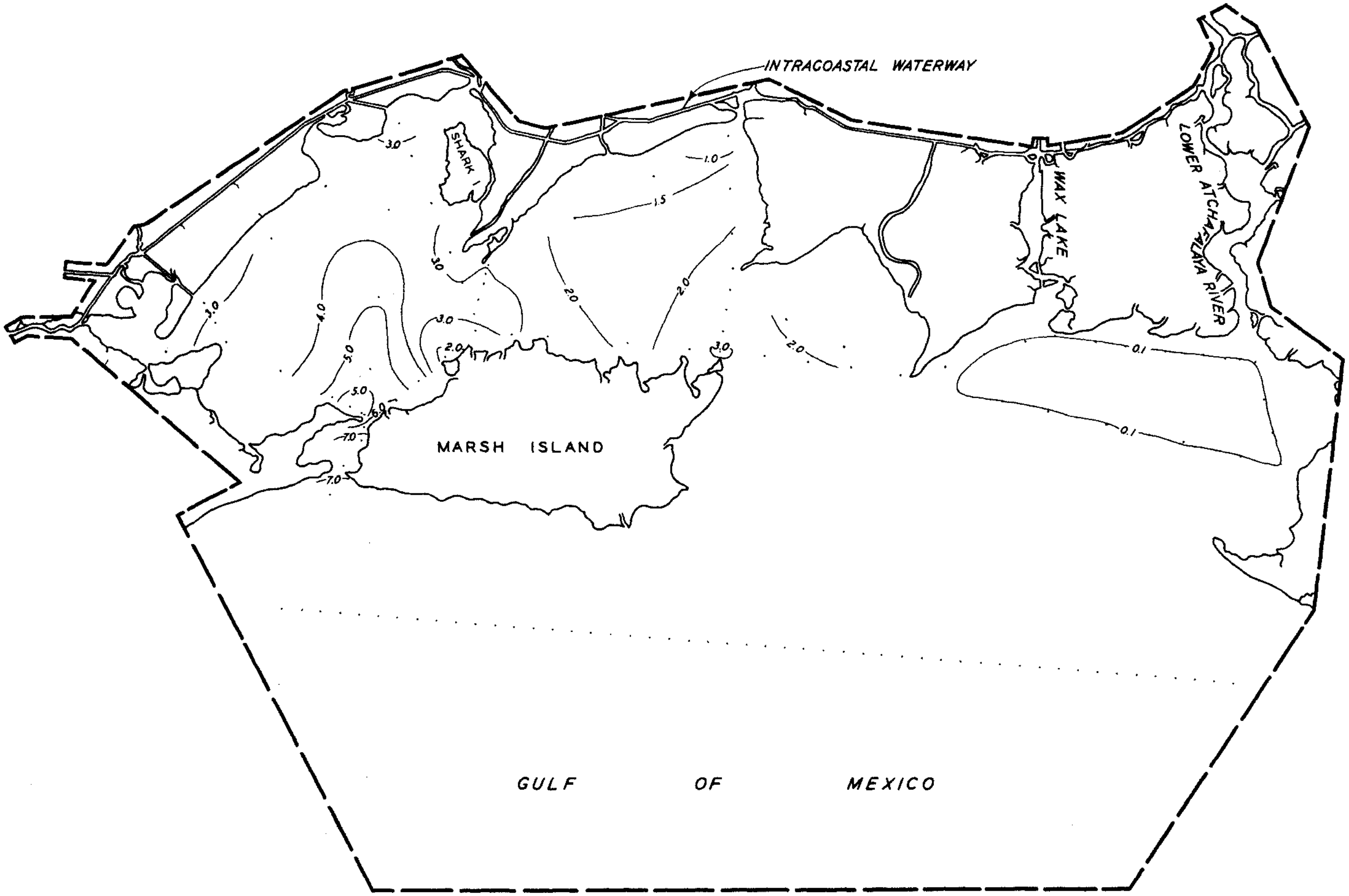
PROTOTYPE
SALINITY SURVEY
30 SEPTEMBER 1955

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT



NOTE: ISOCHLORS IN PARTS PER THOUSAND.

MODEL SALINITY SURVEY 30 SEPTEMBER 1955

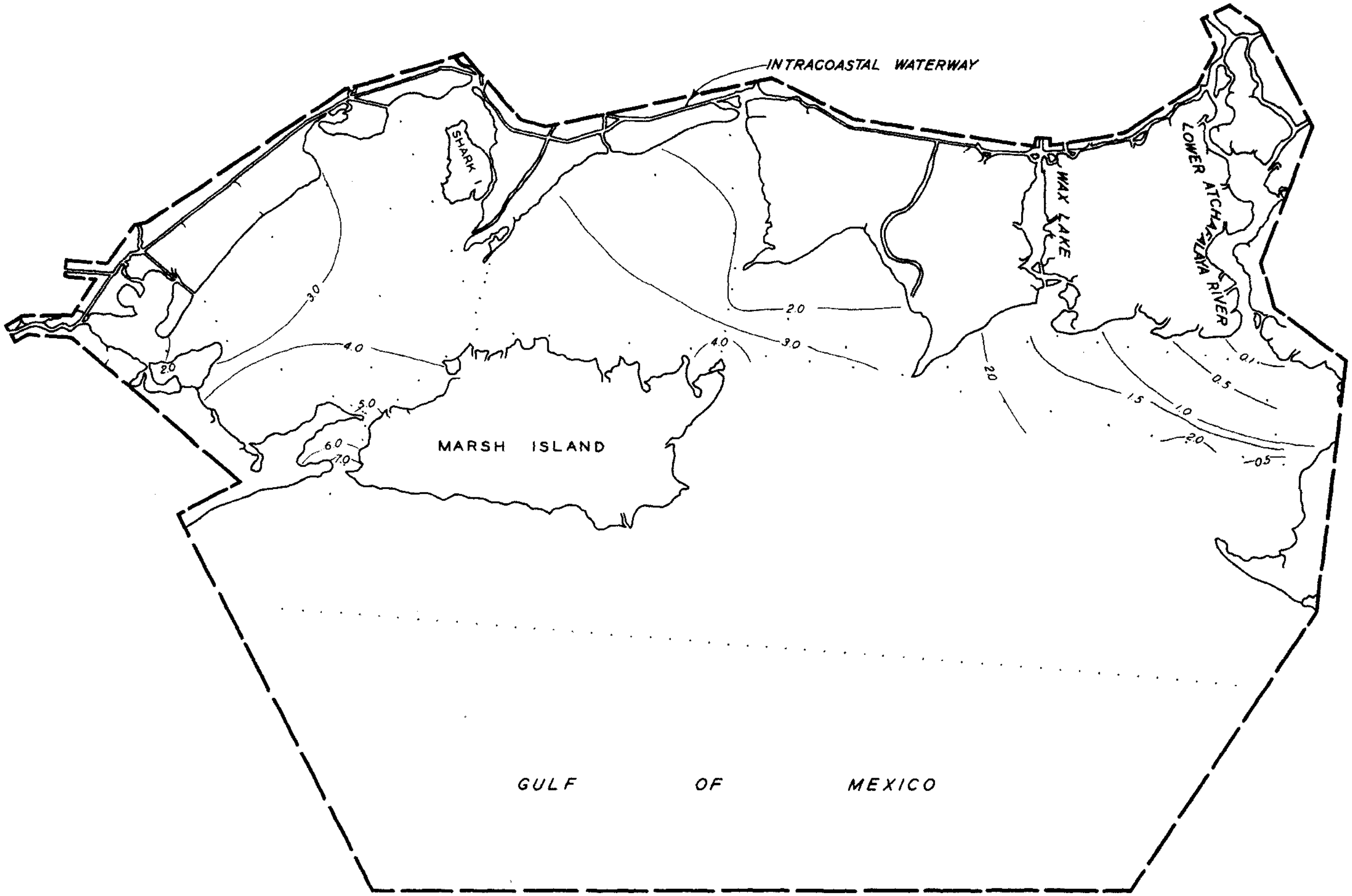
SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT

PLATE 47

PLATE 48



PROTOTYPE SALINITY SURVEY

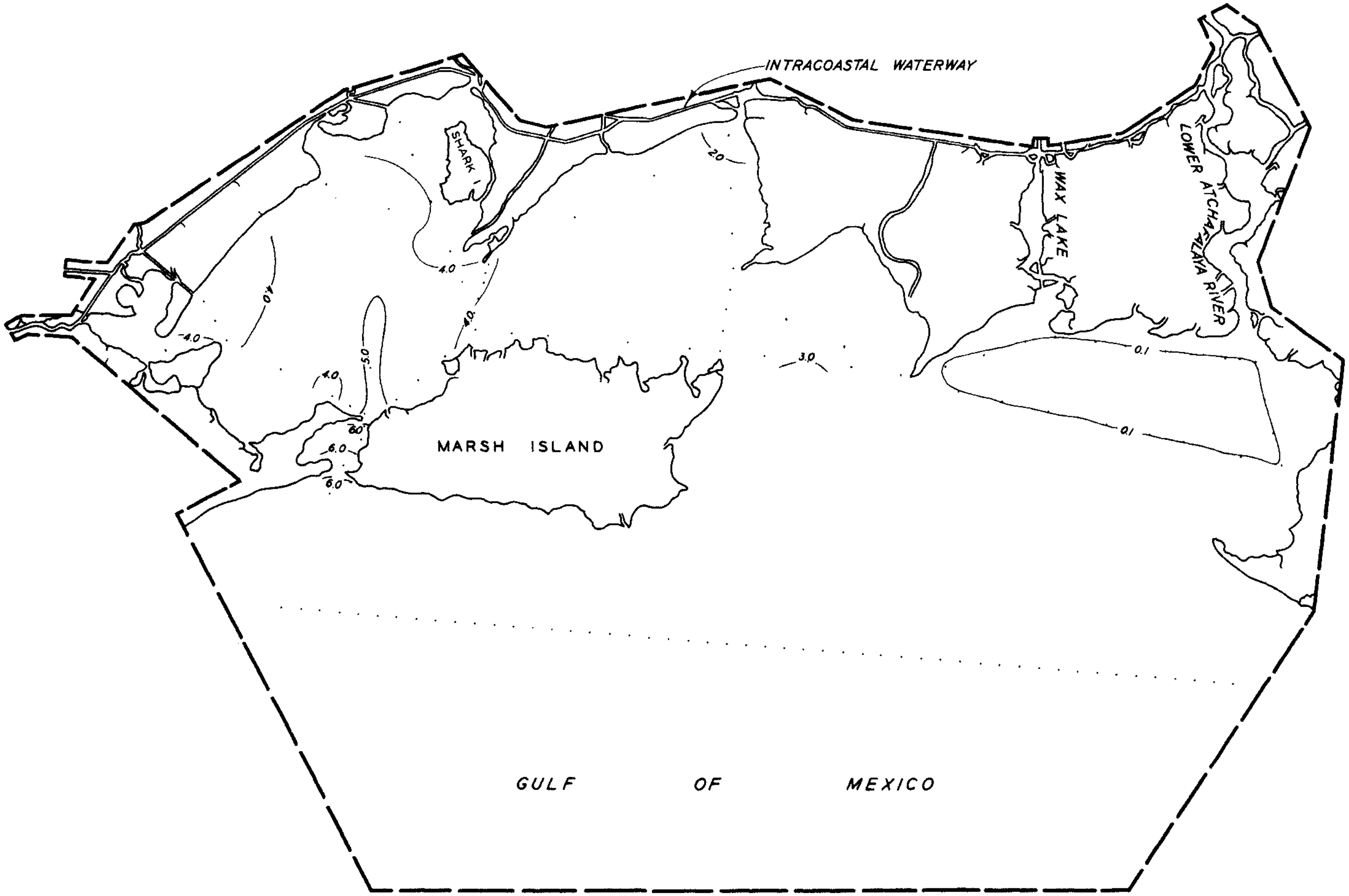
13 OCTOBER 1955

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT



MODEL SALINITY SURVEY
13 OCTOBER 1955

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

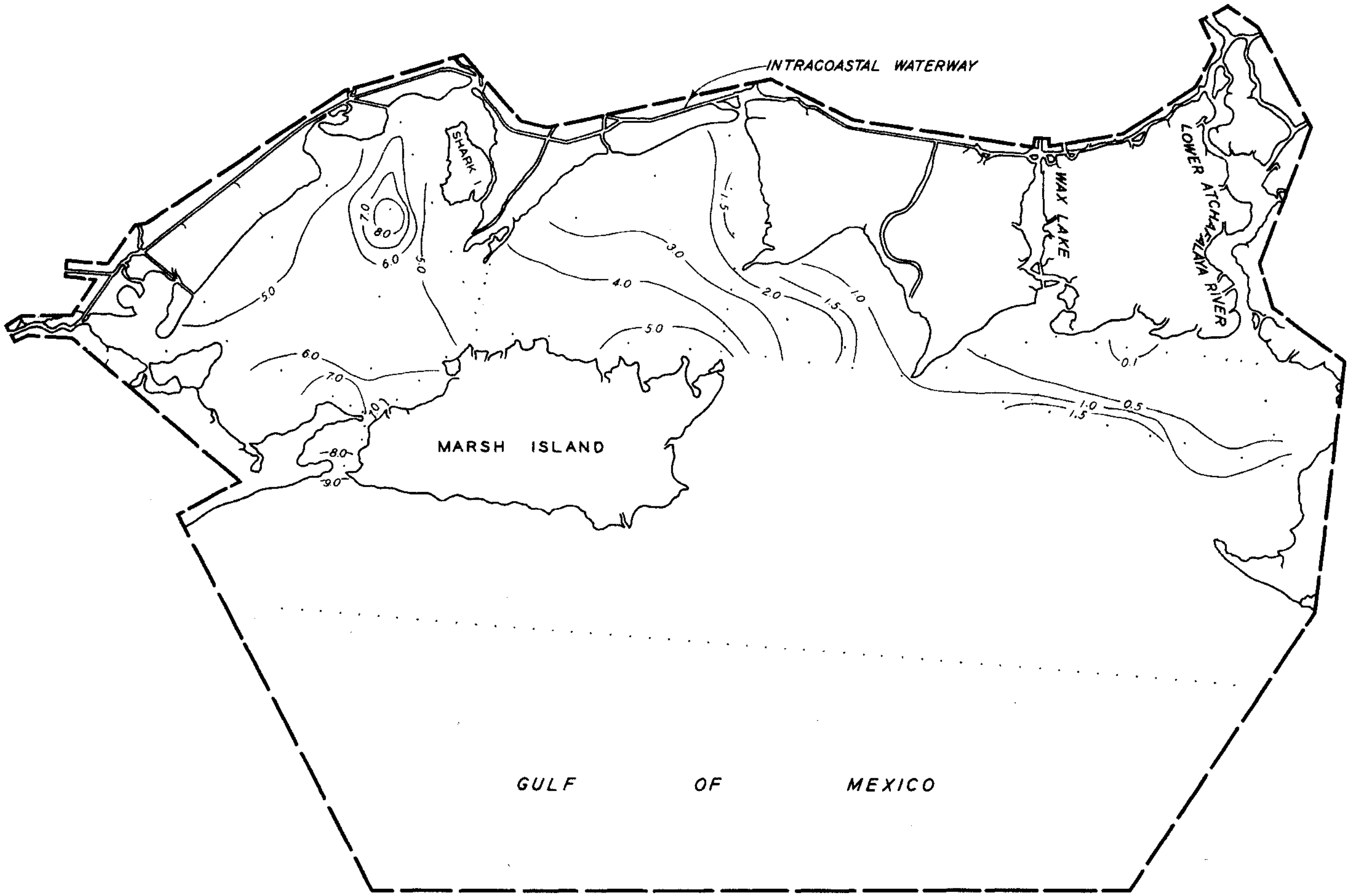
SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT

PLATE 49

PLATE 50



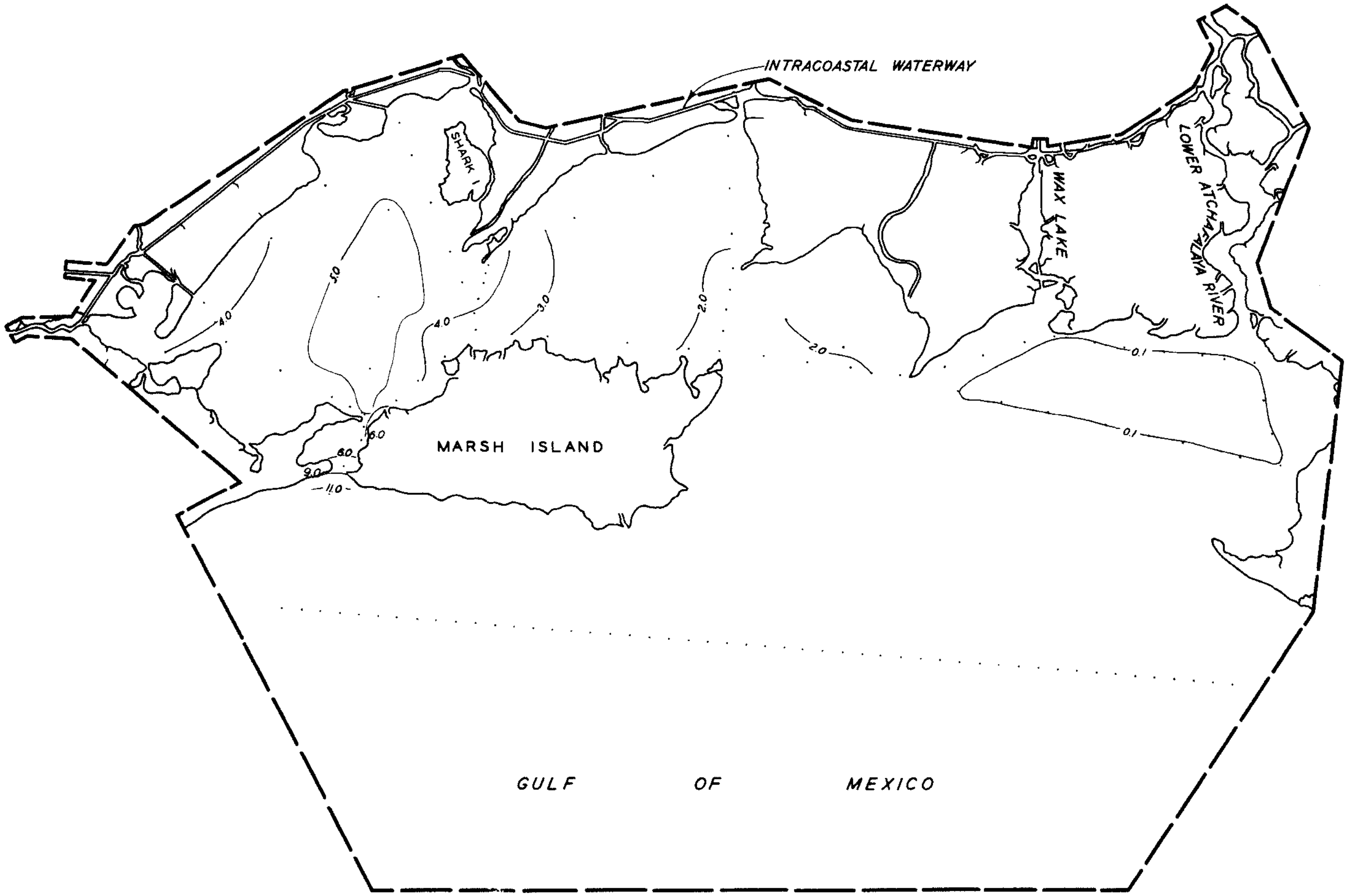
PROTOTYPE SALINITY SURVEY
28 OCTOBER 1955

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT



MODEL SALINITY SURVEY

28 OCTOBER 1955

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

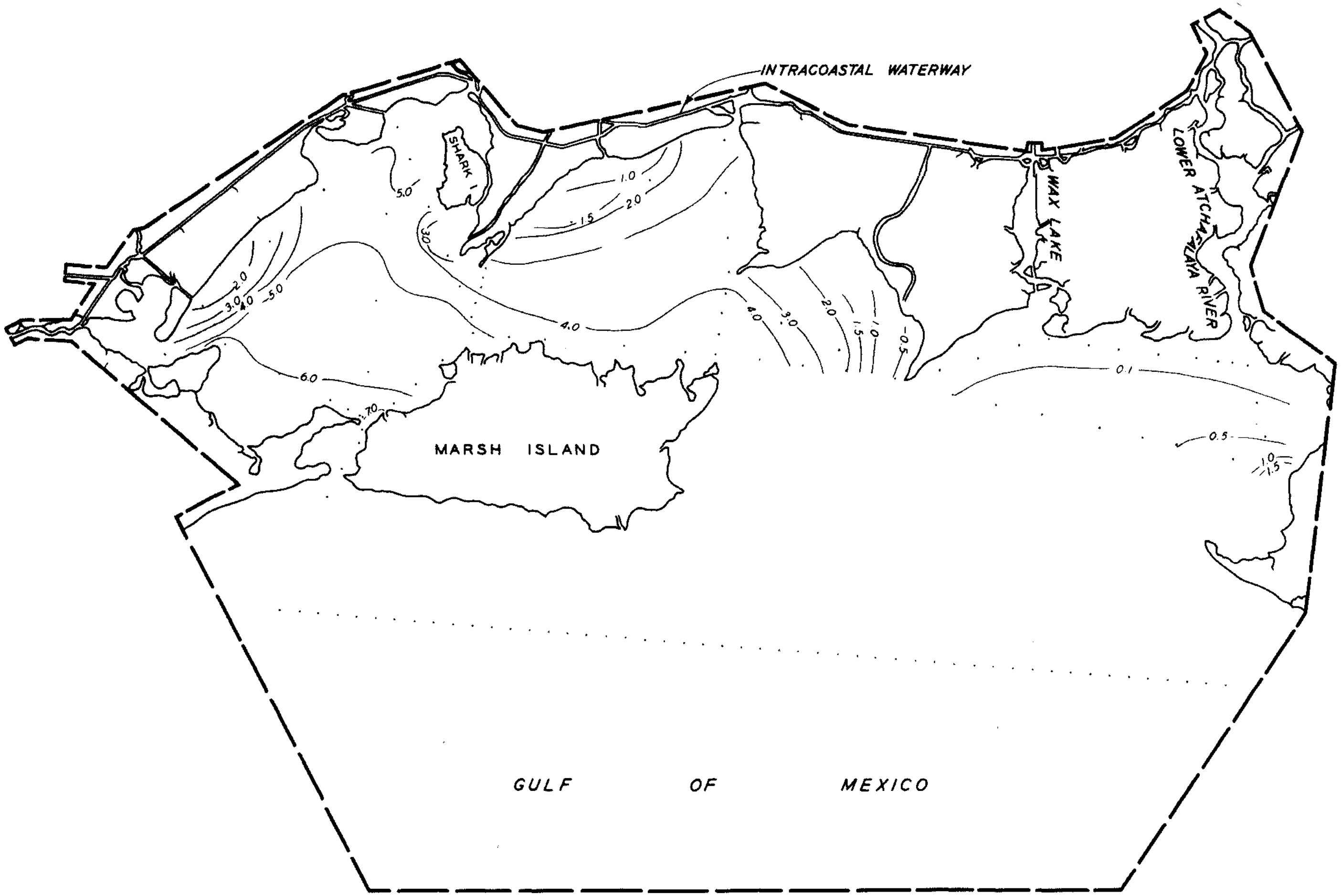
SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT

PLATE 51

PLATE 52



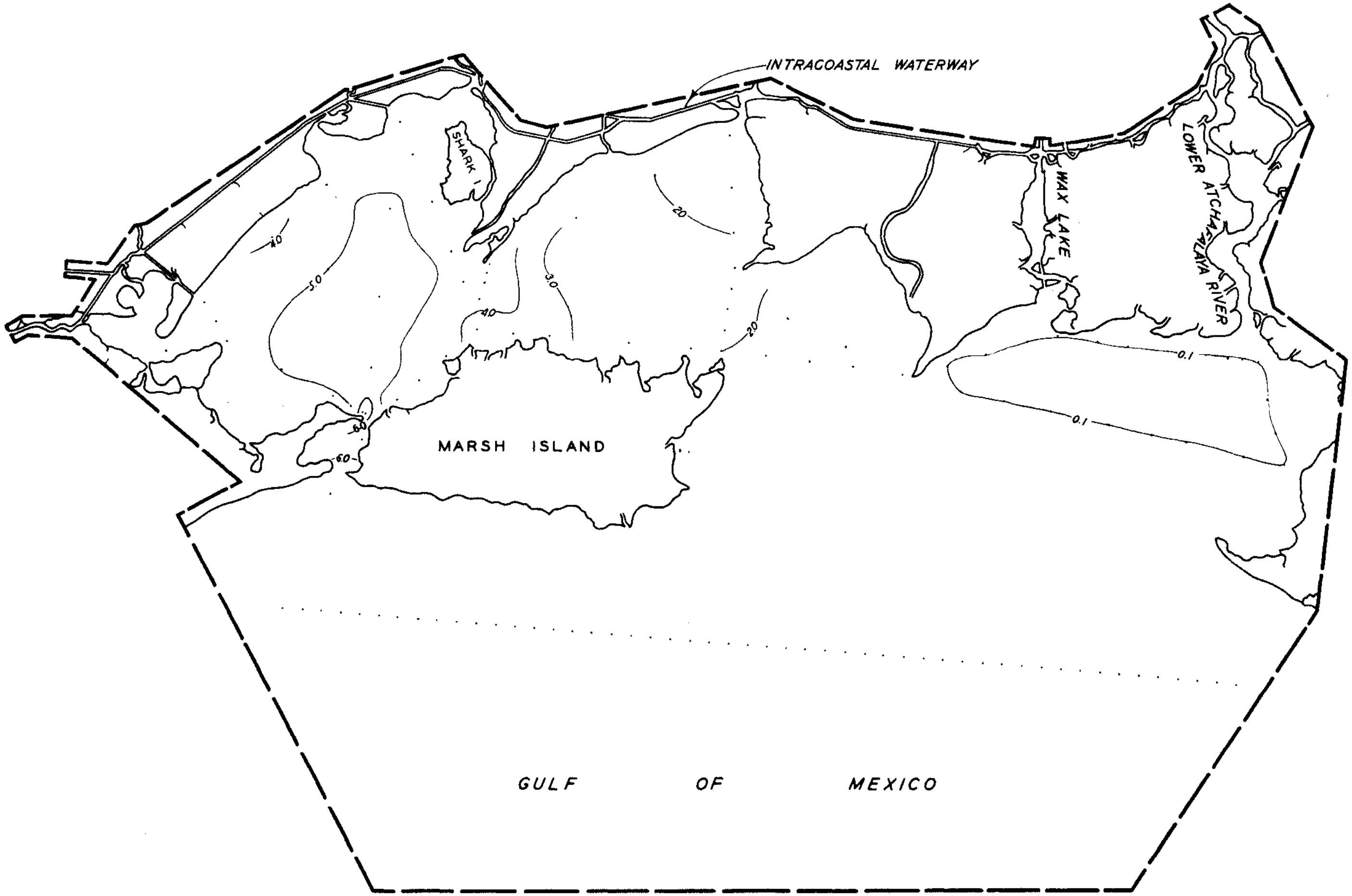
NOTE: ISOCHLORS IN PARTS PER THOUSAND.

PROTOTYPE SALINITY SURVEY

15 NOVEMBER 1955

SCALE

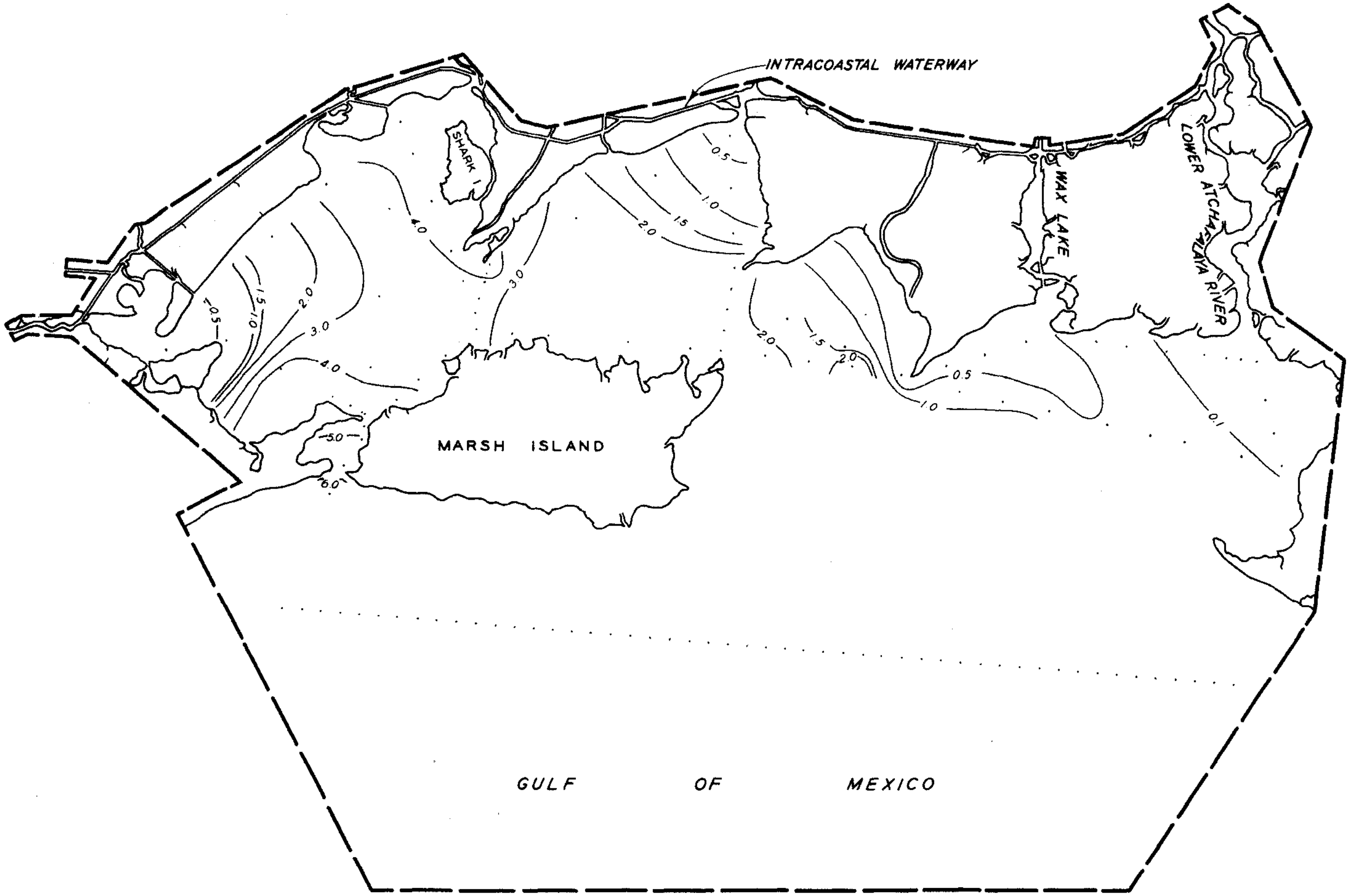
PROTOTYPE	20,000	0	20,000	40,000	60,000 FT
MODEL	10	0	10	20	30 FT



NOTE: ISOCHLORS IN PARTS PER THOUSAND.

MODEL
SALINITY SURVEY
15 NOVEMBER 1955

SCALE
PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT

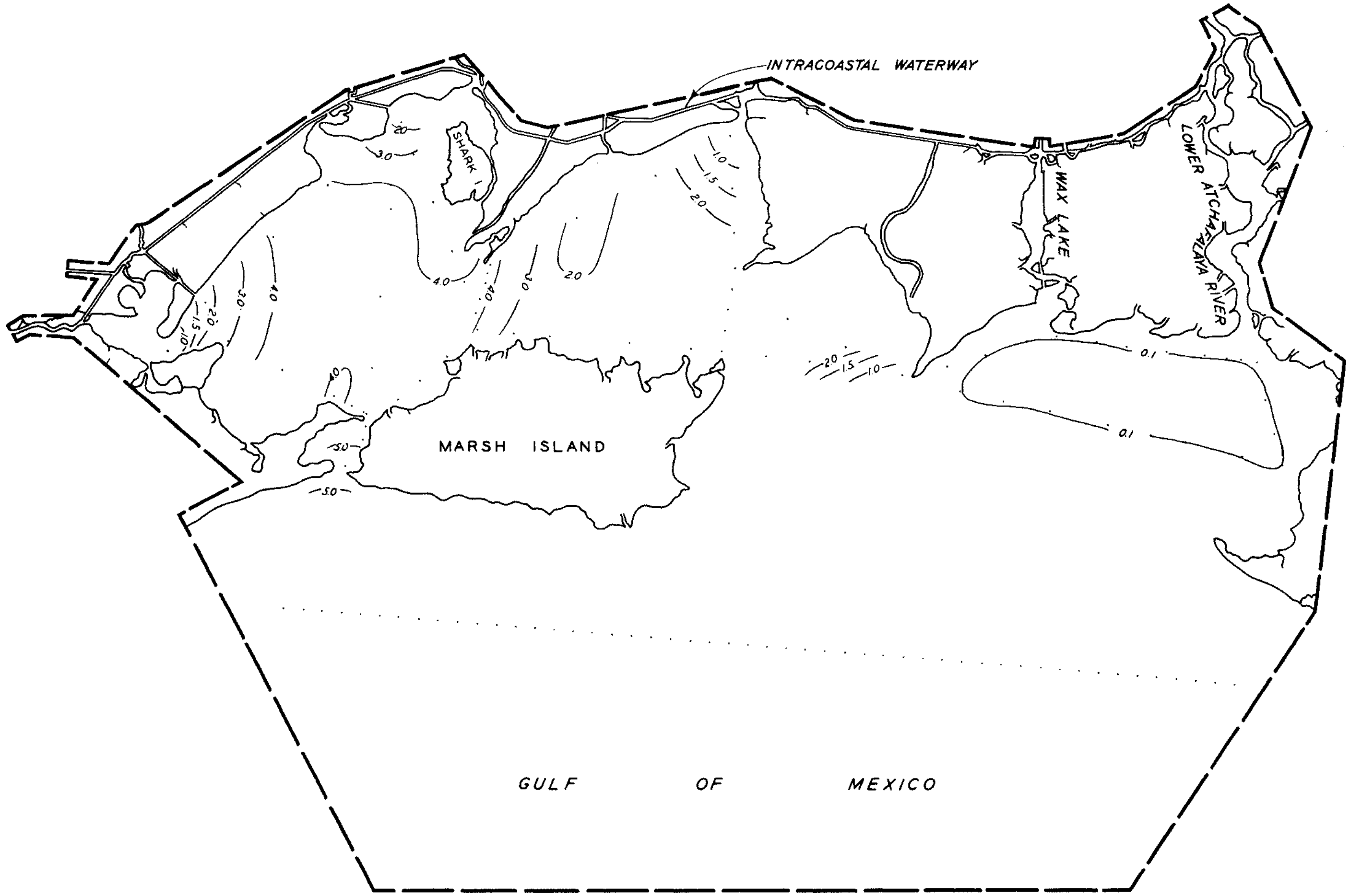


NOTE: ISOCHLORS IN PARTS PER THOUSAND.

PROTOTYPE SALINITY SURVEY
7 DECEMBER 1955

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT

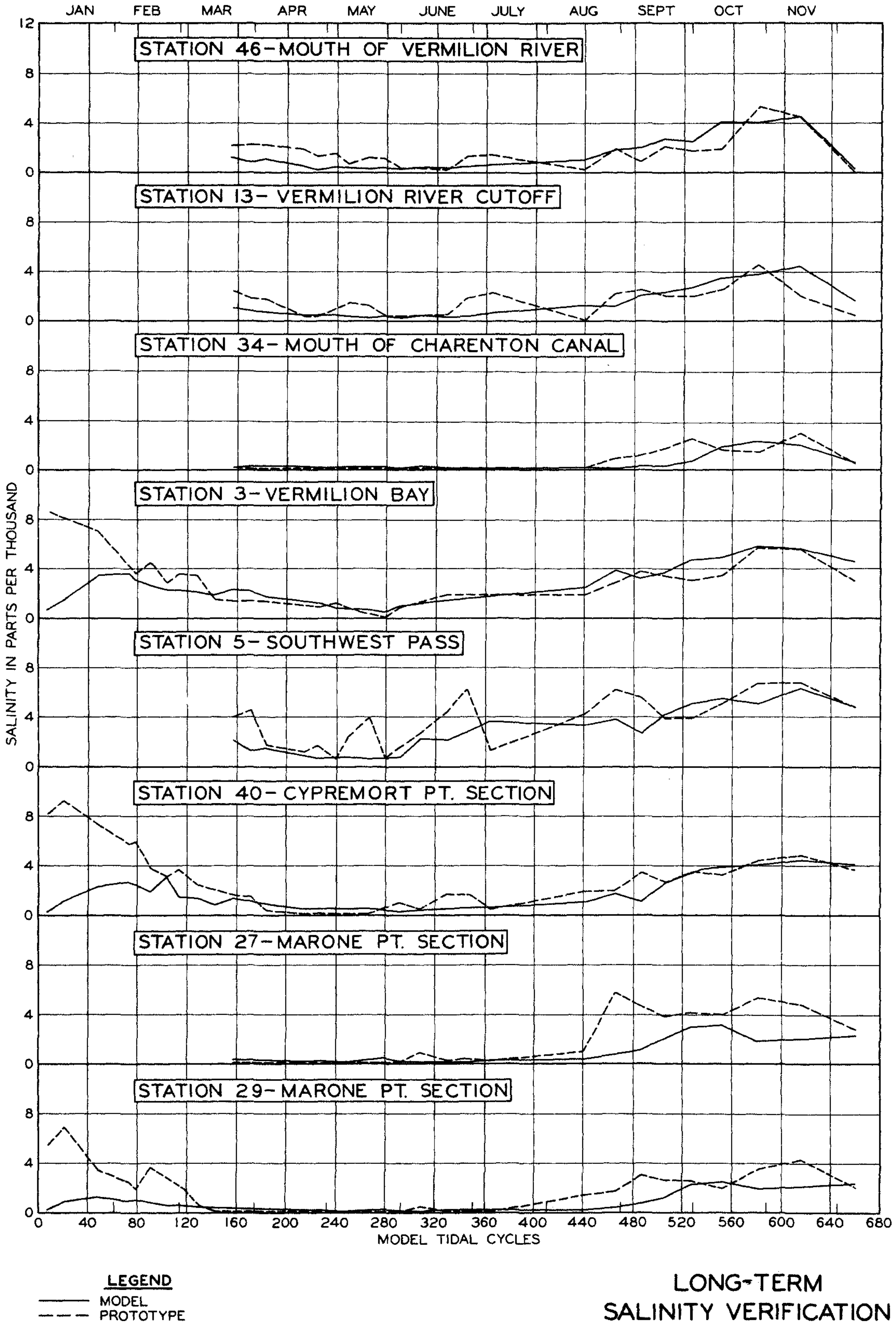


MODEL
SALINITY SURVEY
7 DECEMBER 1955

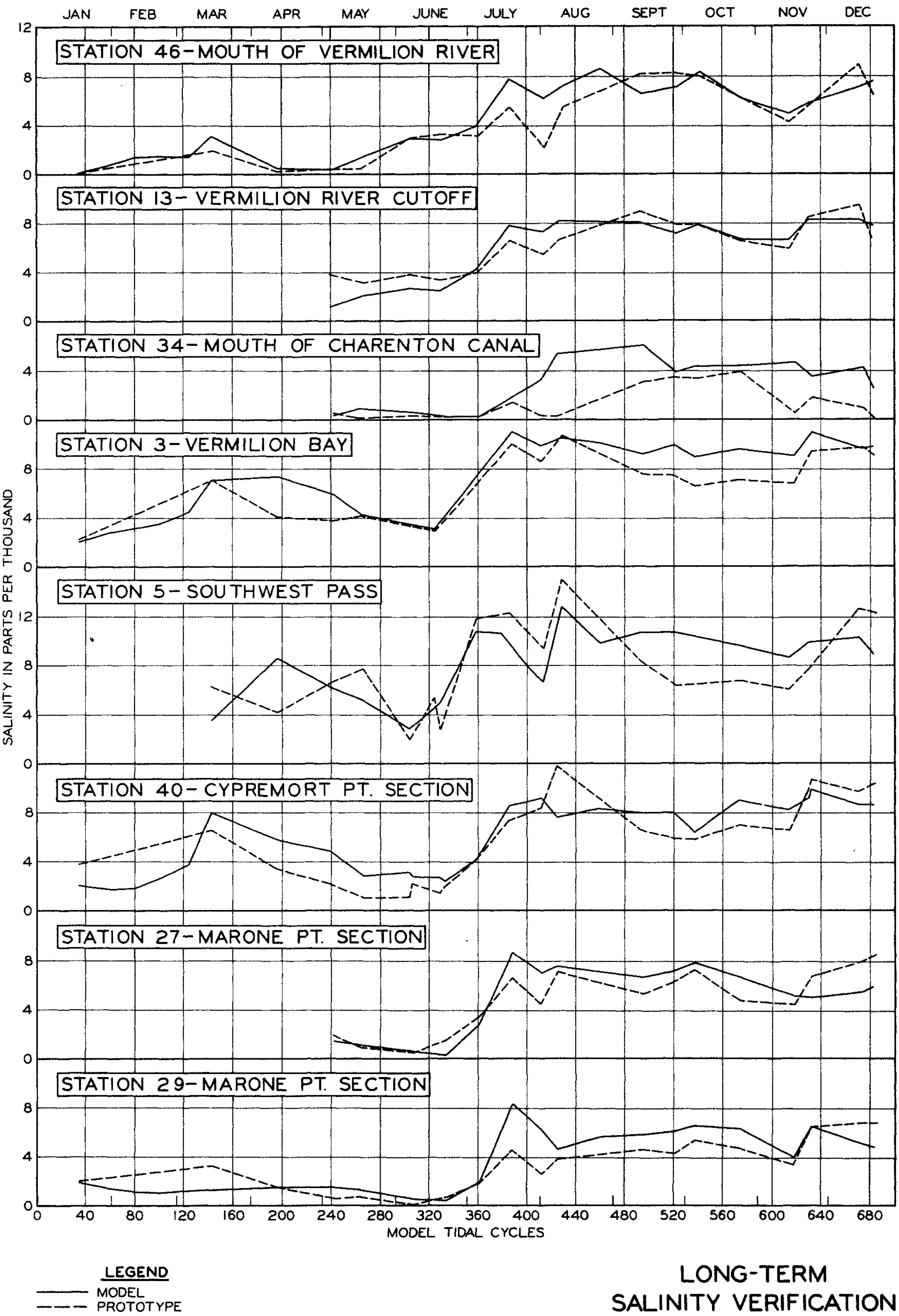
NOTE: ISOCHLORS IN PARTS PER THOUSAND.

SCALE

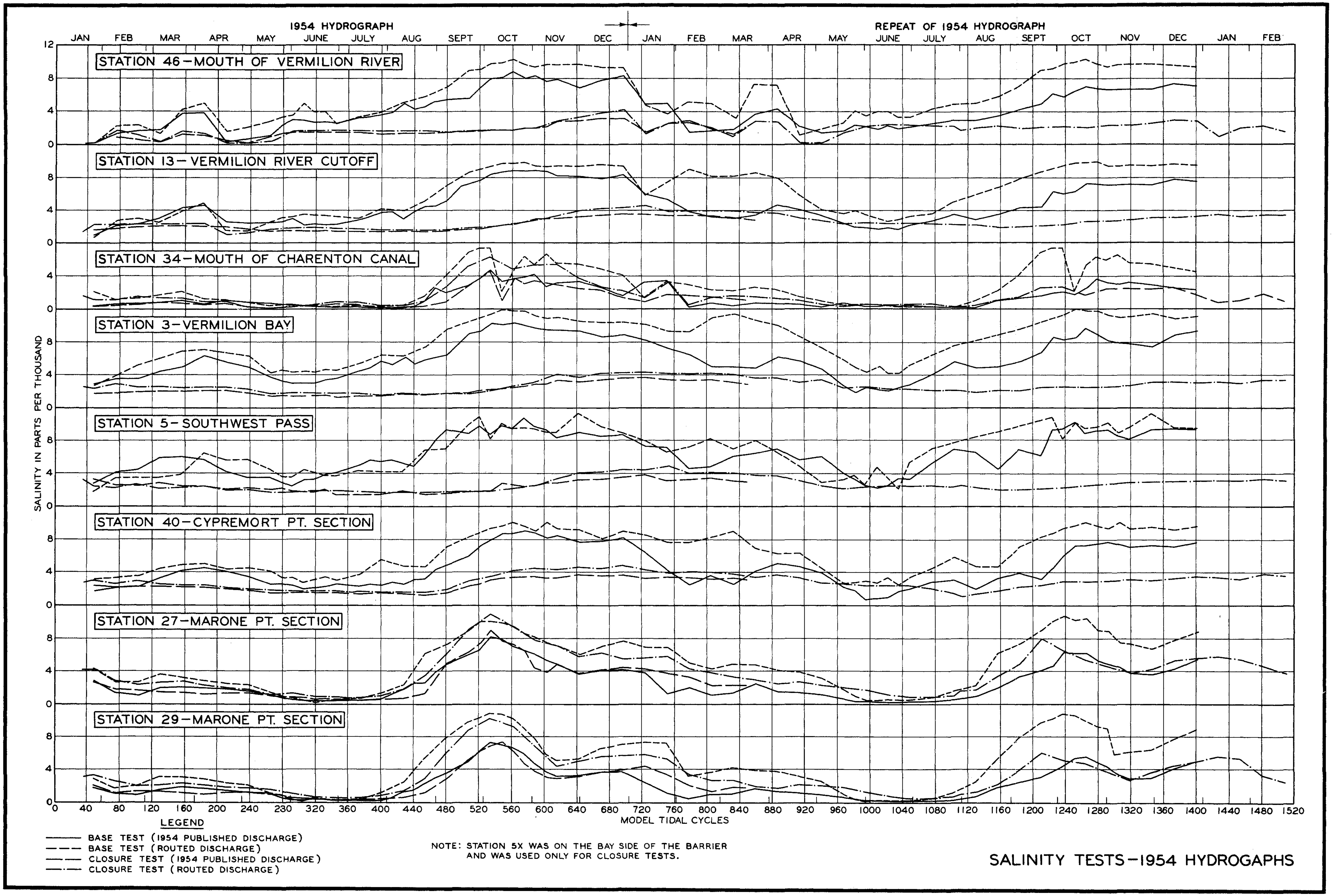
PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT



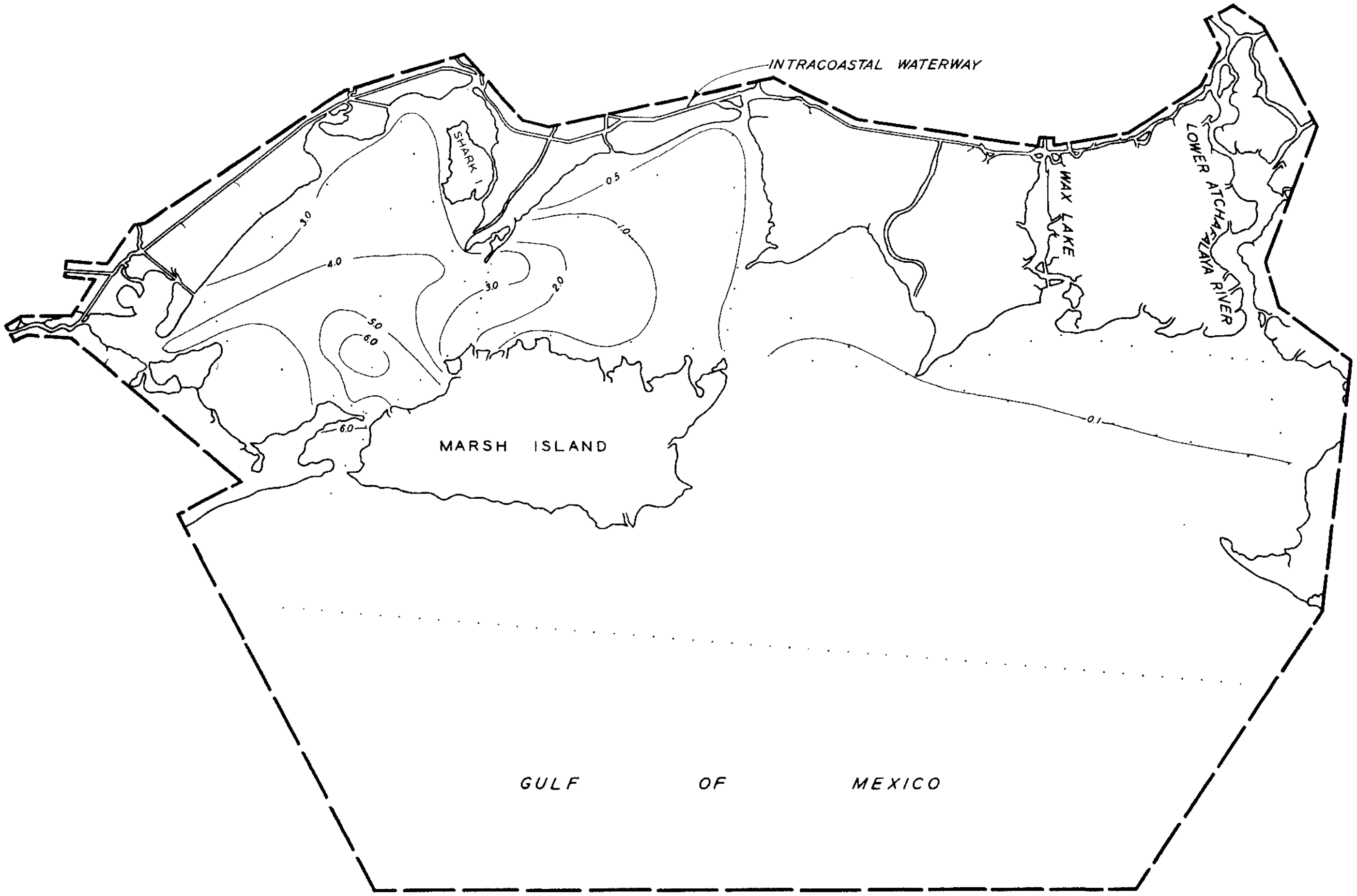
LONG-TERM
SALINITY VERIFICATION
YEAR 1955



LONG-TERM
SALINITY VERIFICATION
YEAR 1954



SALINITY TESTS—1954 HYDROGAPHS



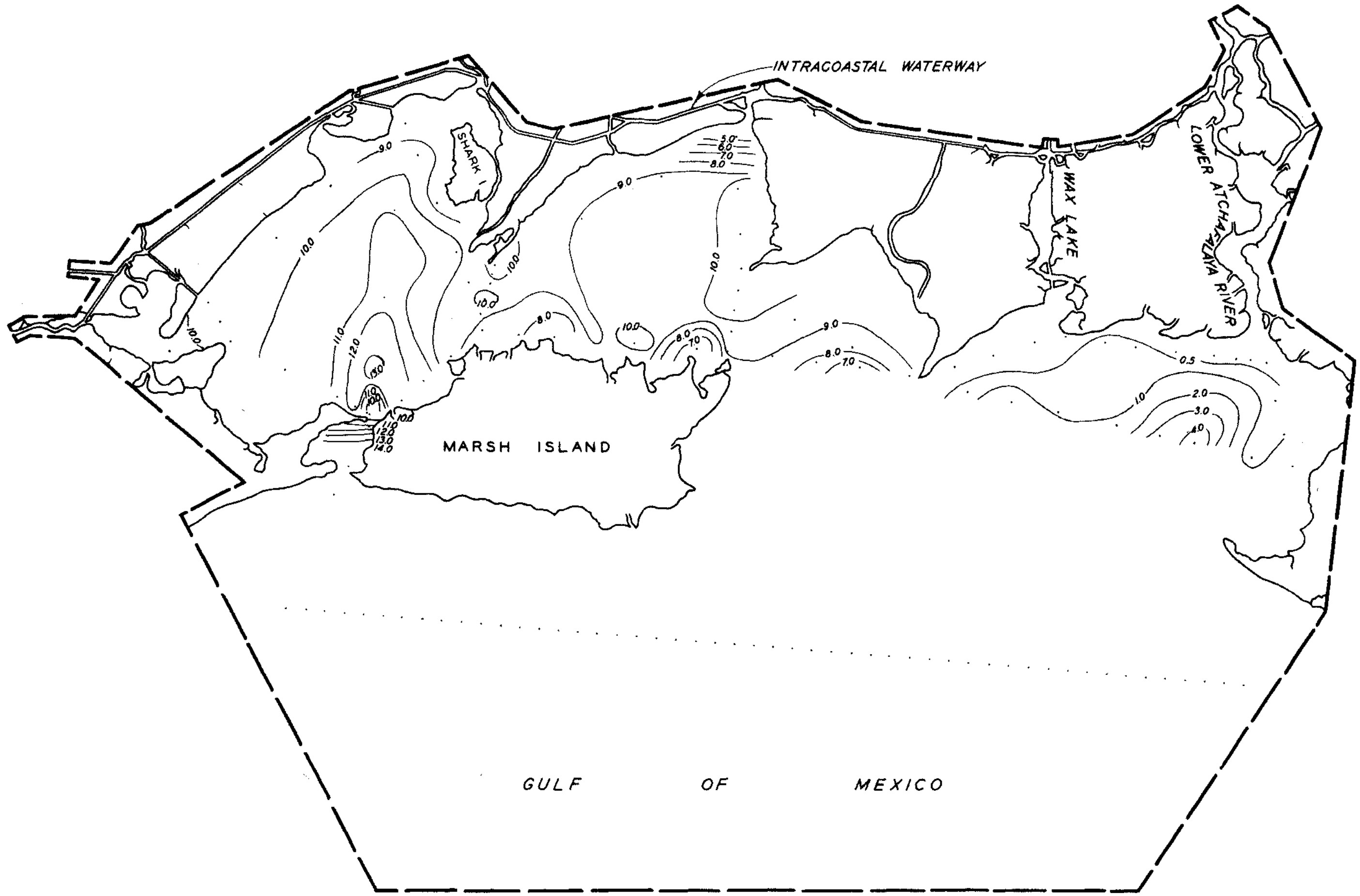
BASE TEST
ROUTED 1954 DISCHARGE
LOW SALINITY SURVEY–FIRST YEAR

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT

PLATE 59



BASE TEST

ROUTED 1954 DISCHARGE

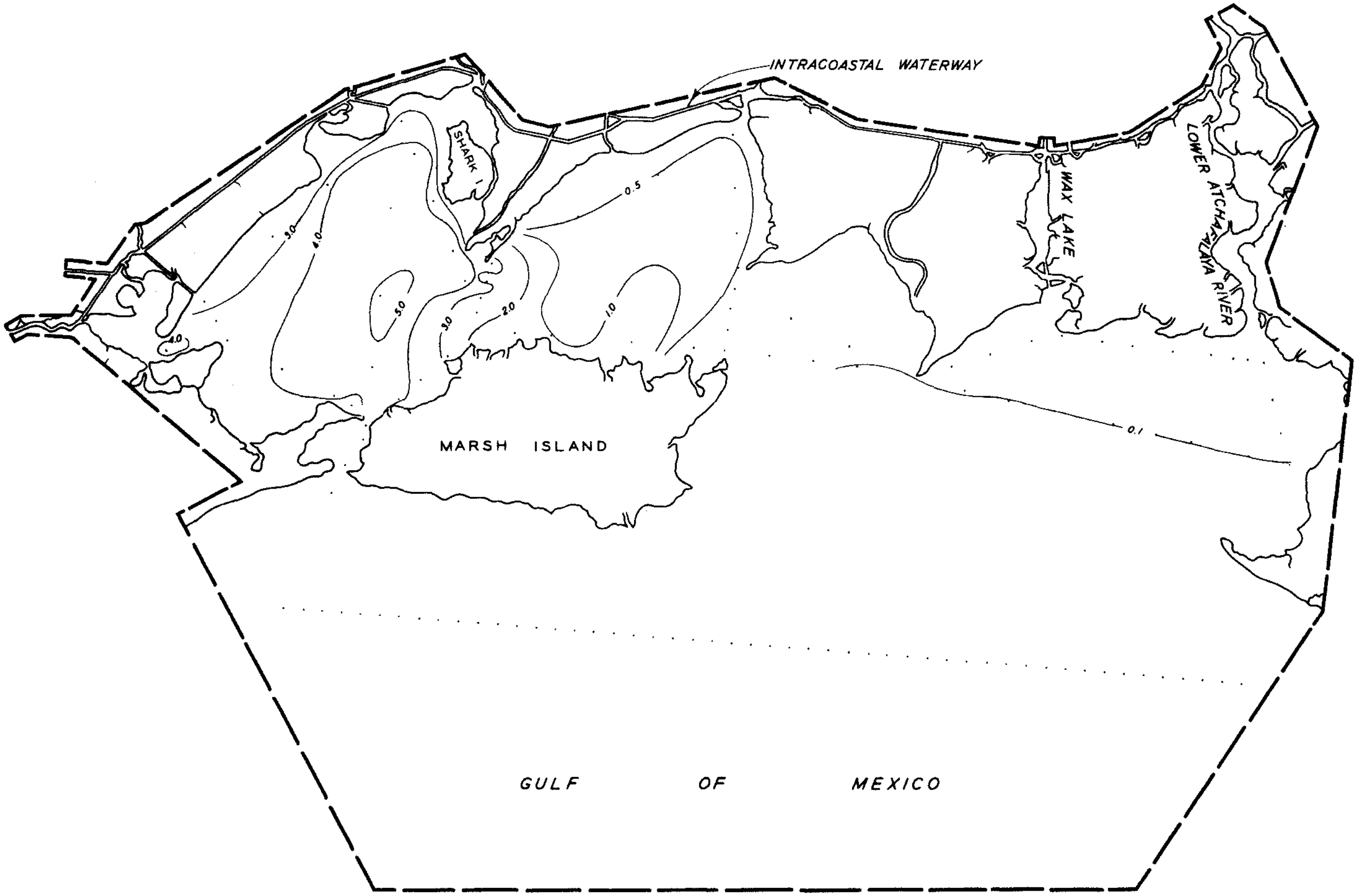
HIGH SALINITY SURVEY-FIRST YEAR

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT



NOTE: ISOCHLORS IN PARTS PER THOUSAND.

BASE TEST

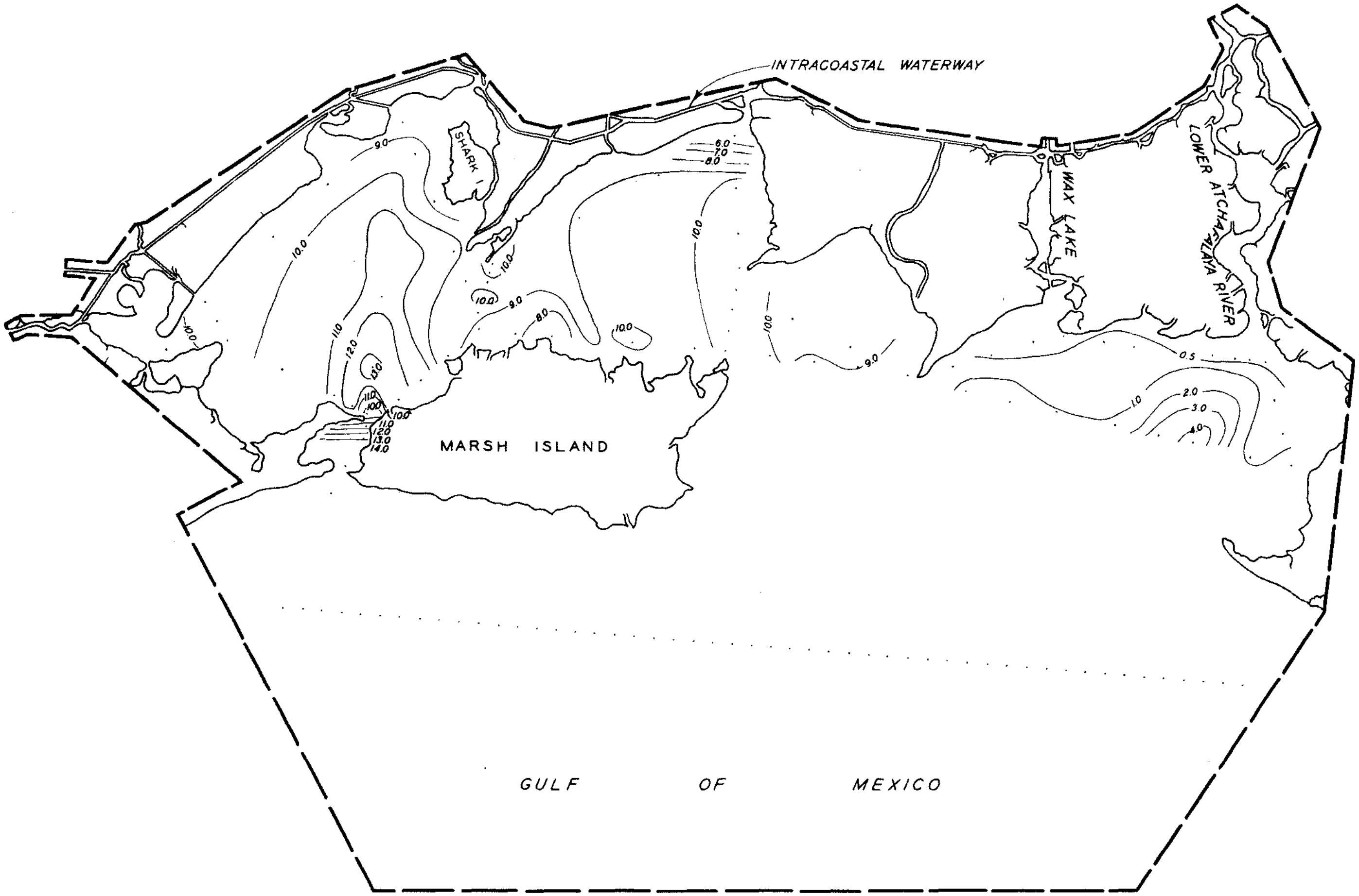
ROUTED 1954 DISCHARGE

LOW SALINITY SURVEY–SECOND YEAR

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT



NOTE: ISOCHLORS IN PARTS PER THOUSAND

BASE TEST

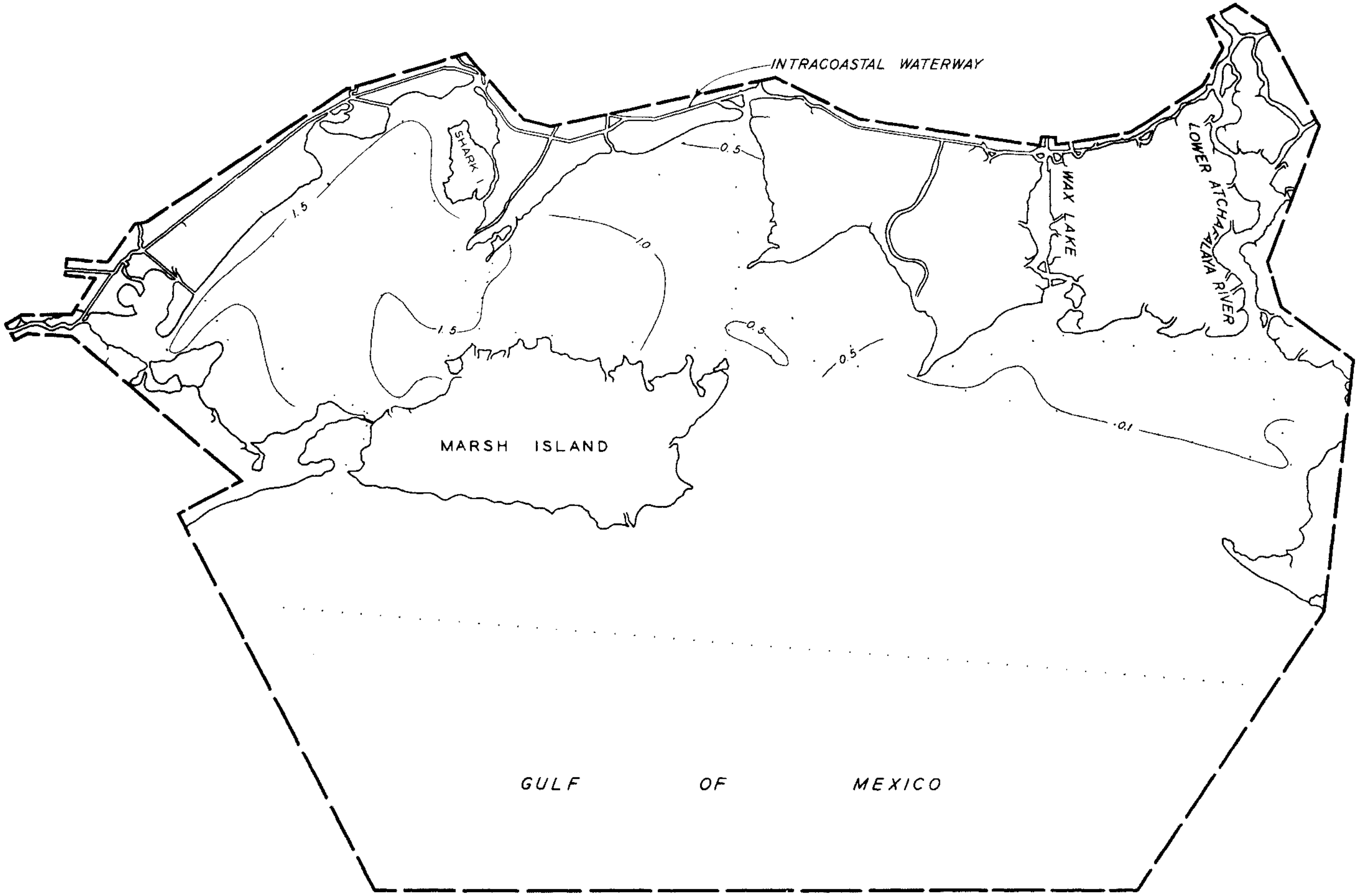
ROUTED 1954 DISCHARGE

HIGH SALINITY SURVEY-SECOND YEAR

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT



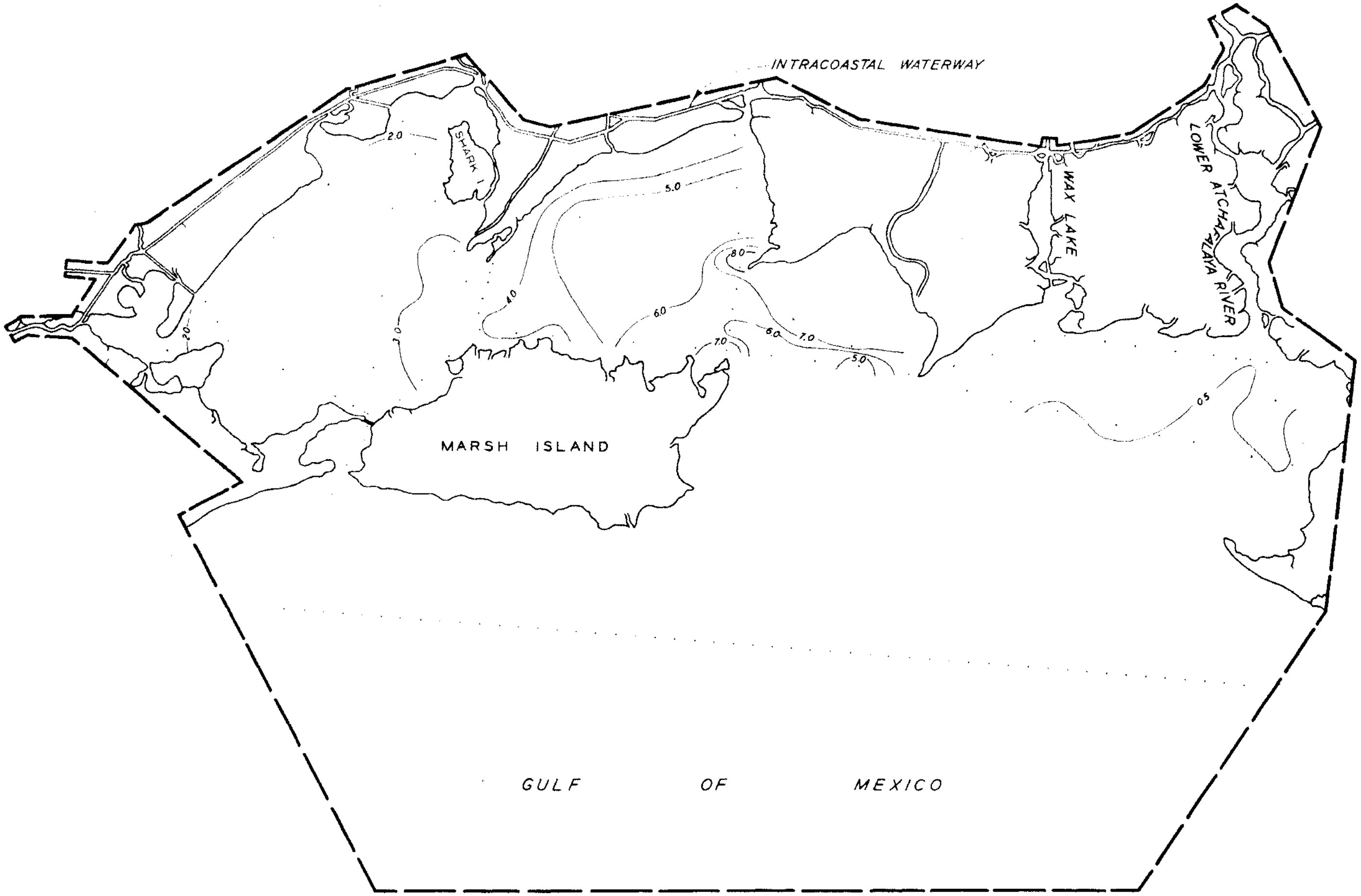
CLOSURE TEST
PUBLISHED 1954 DISCHARGE
LOW SALINITY SURVEY

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT

PLATE 64

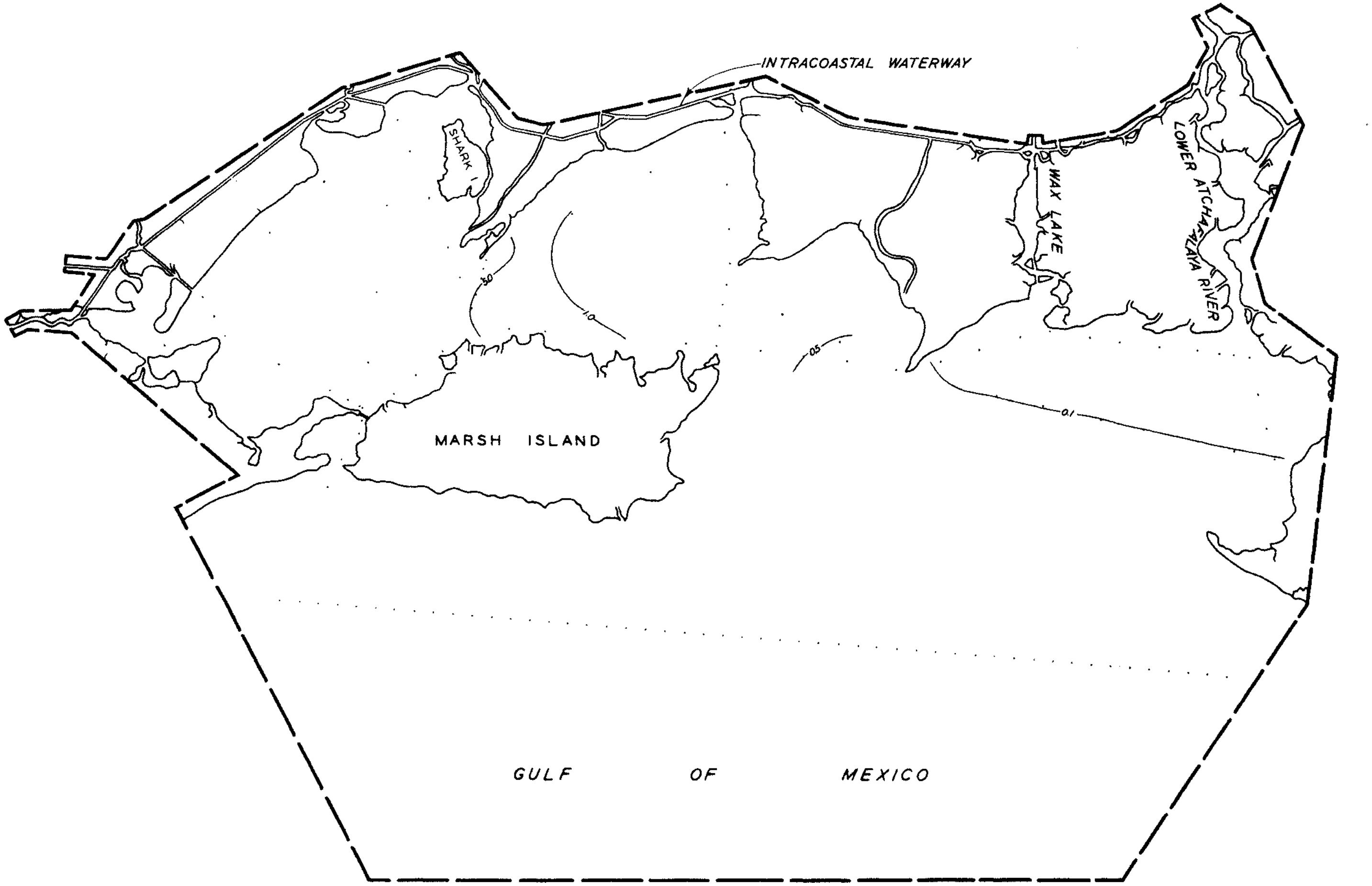


NOTE: ISOCHLORS IN PARTS PER THOUSAND

CLOSURE TEST
PUBLISHED 1954 DISCHARGE
HIGH SALINITY SURVEY

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT

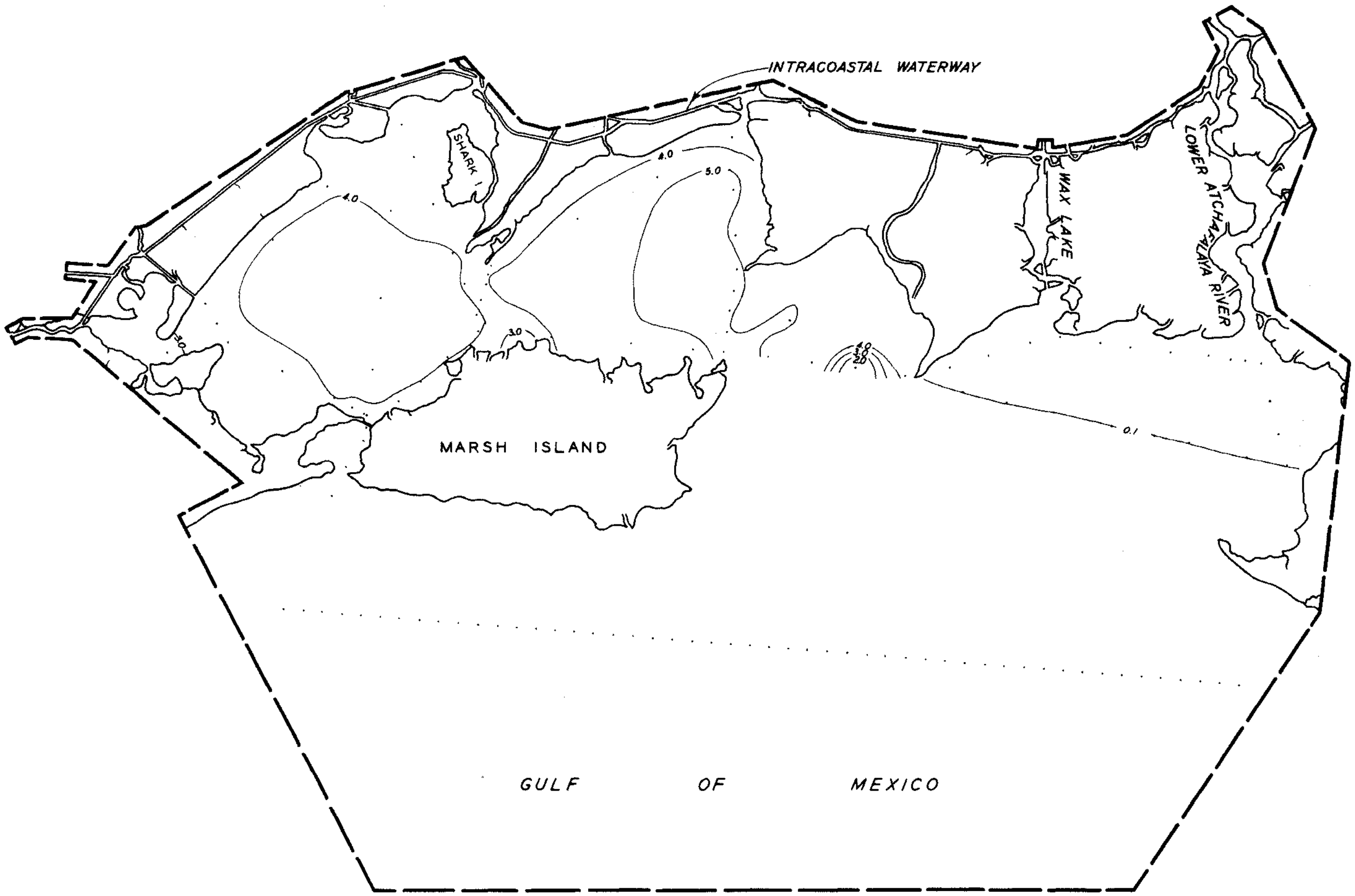


CLOSURE TEST
ROUTED 1954 DISCHARGE
LOW SALINITY SURVEY-FIRST YEAR

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT

NOTE: ISOCHLORS IN PARTS PER THOUSAND.



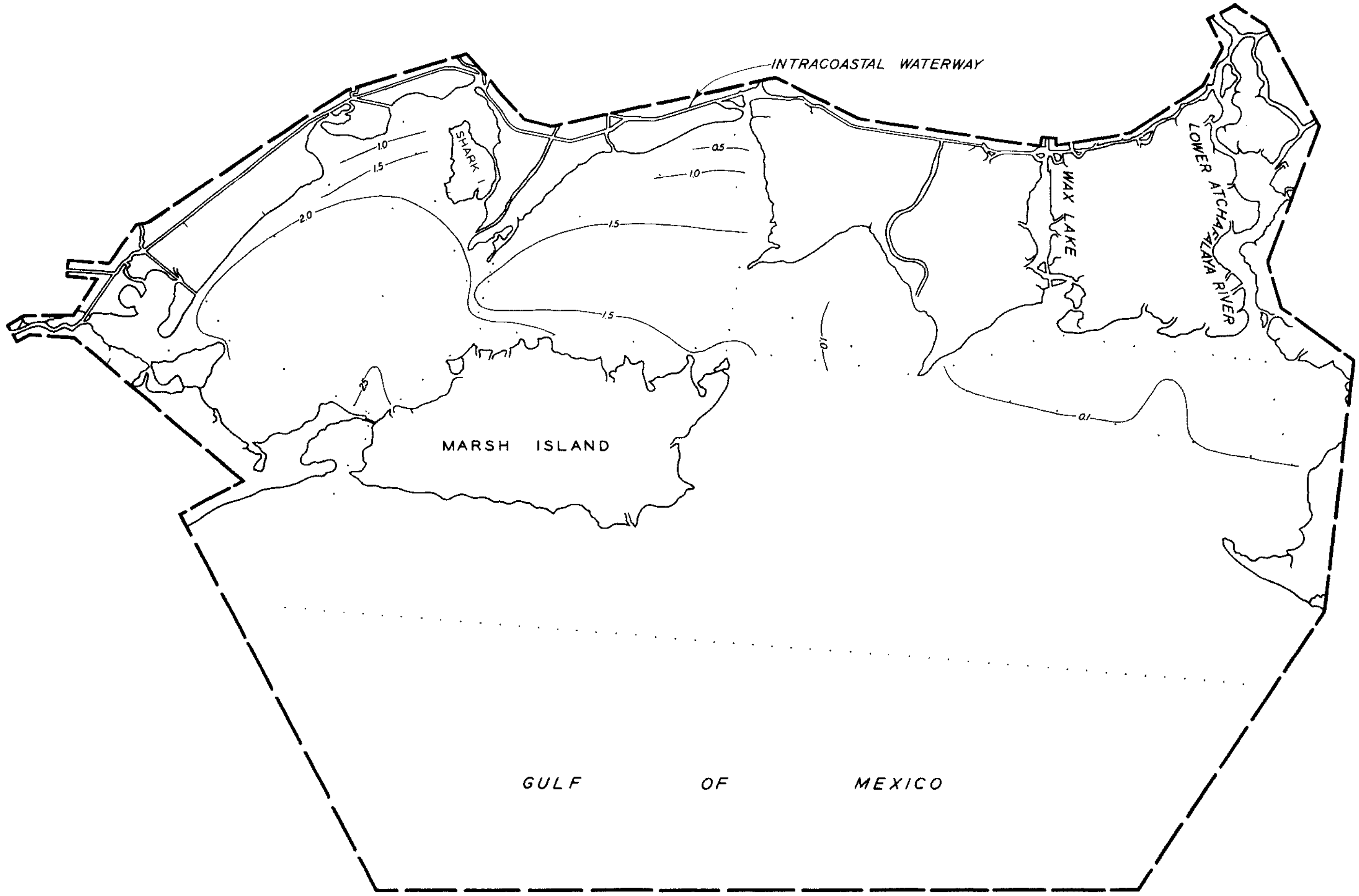
NOTE: ISOCHLORS IN PARTS PER THOUSAND.

CLOSURE TEST
ROUTED 1954 DISCHARGE
HIGH SALINITY SURVEY-FIRST YEAR

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT



CLOSURE TEST

ROUTED 1954 DISCHARGE

LOW SALINITY SURVEY-SECOND YEAR

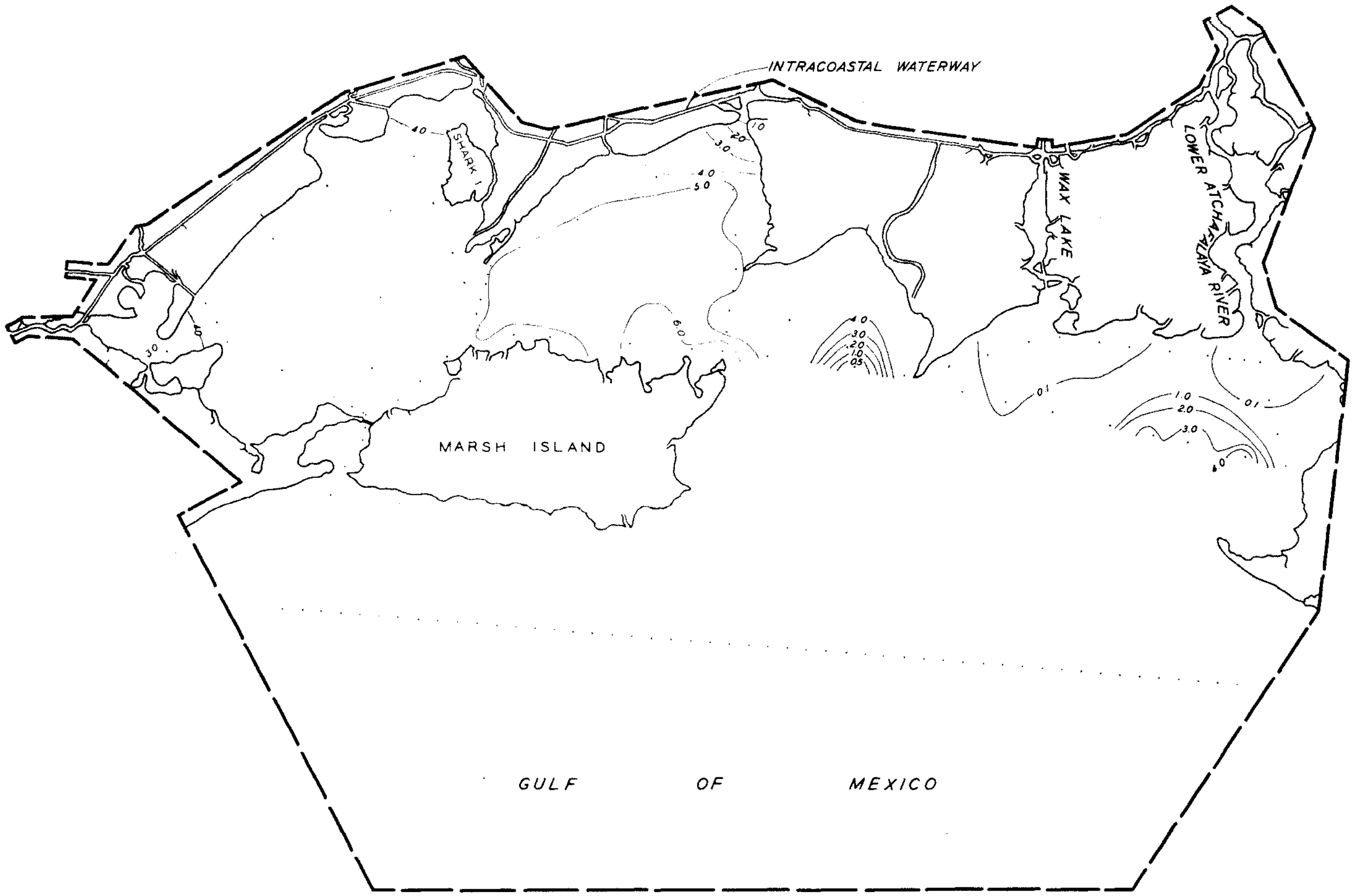
SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

PLATE 68



CLOSURE TEST

ROUTED 1954 DISCHARGE

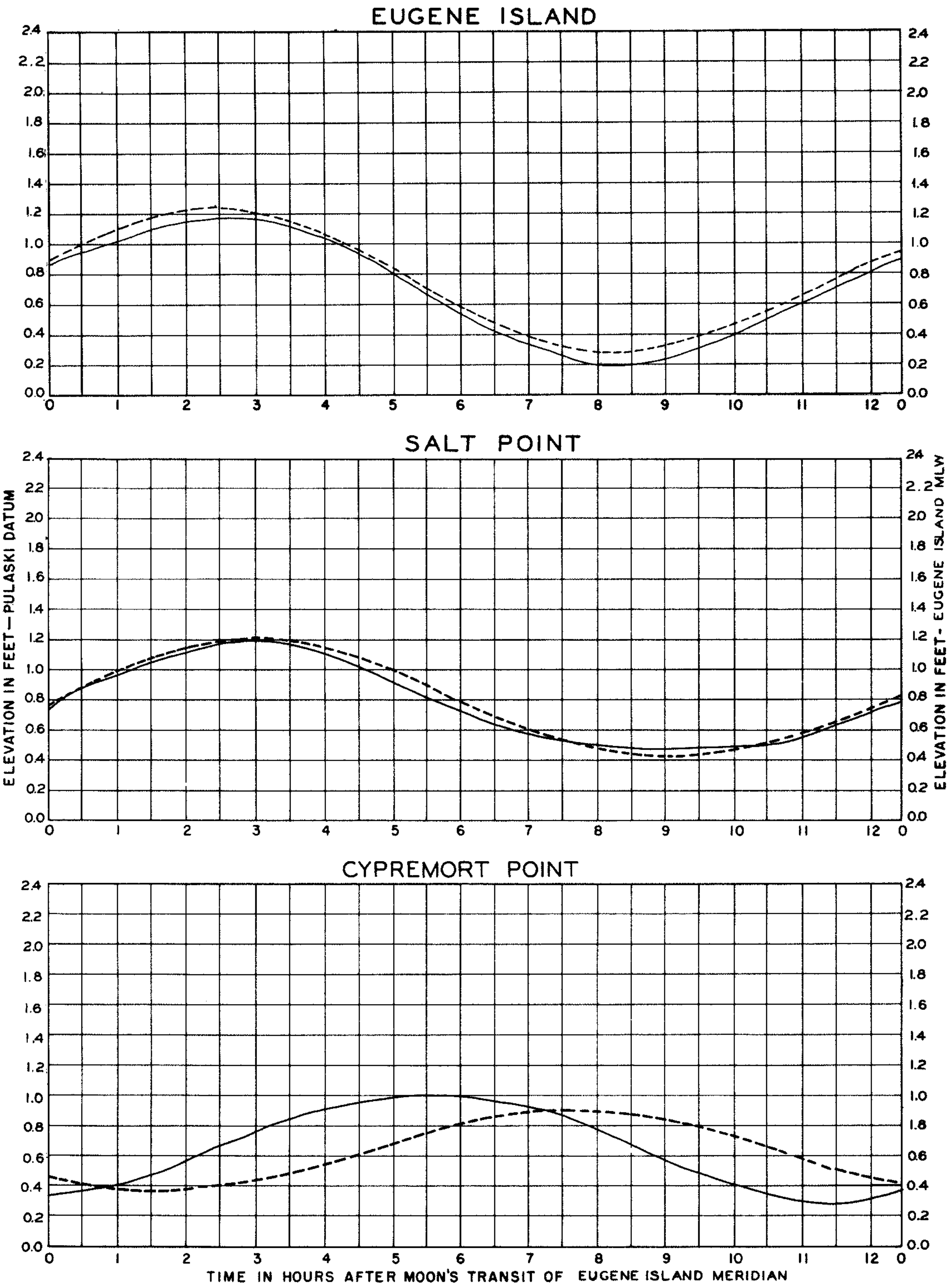
HIGH SALINITY SURVEY-SECOND YEAR

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT



LEGEND

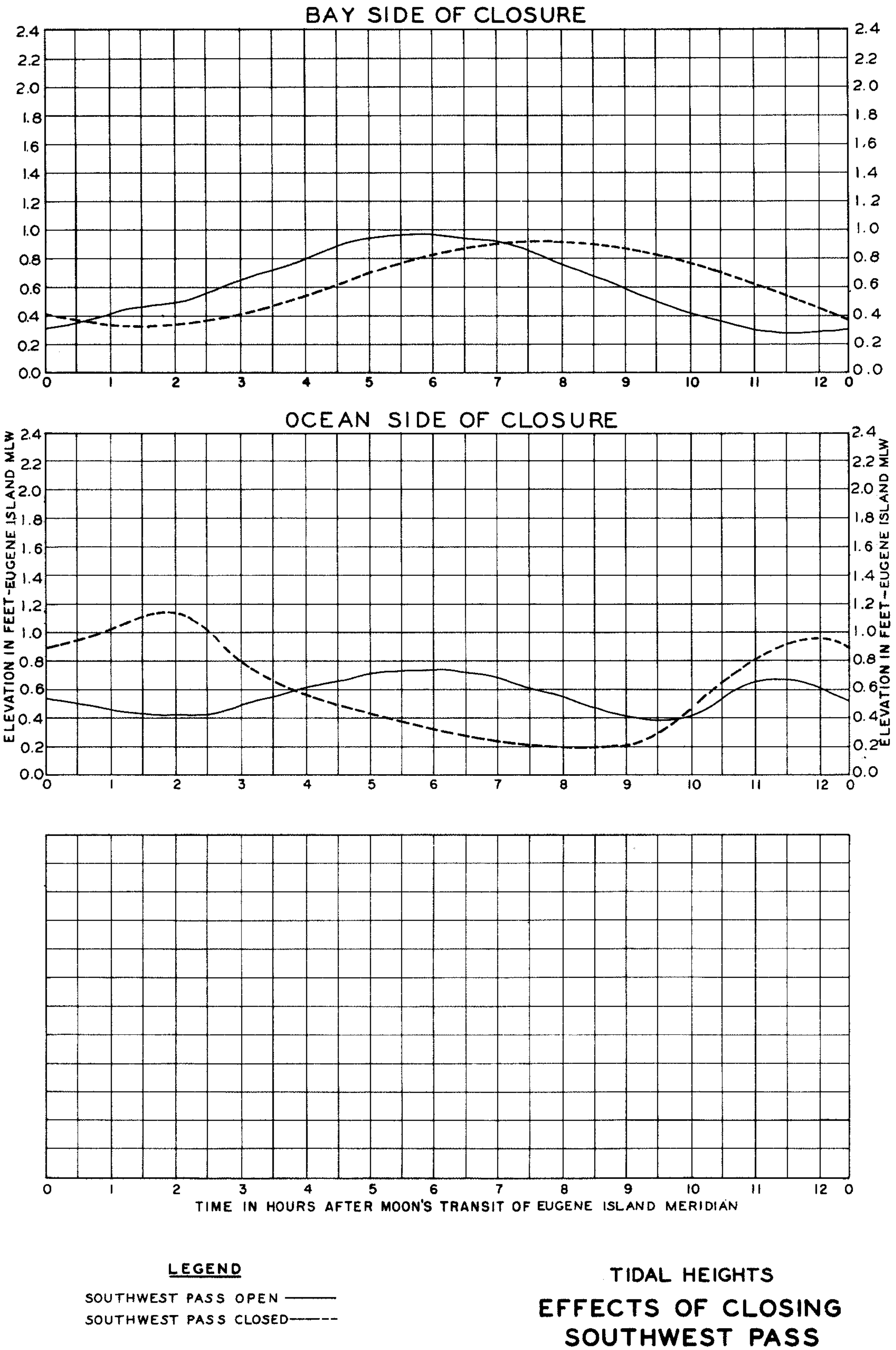
SOUTHWEST PASS OPEN ——

SOUTHWEST PASS CLOSED ---

TIDAL HEIGHTS

EFFECTS OF CLOSING SOUTHWEST PASS

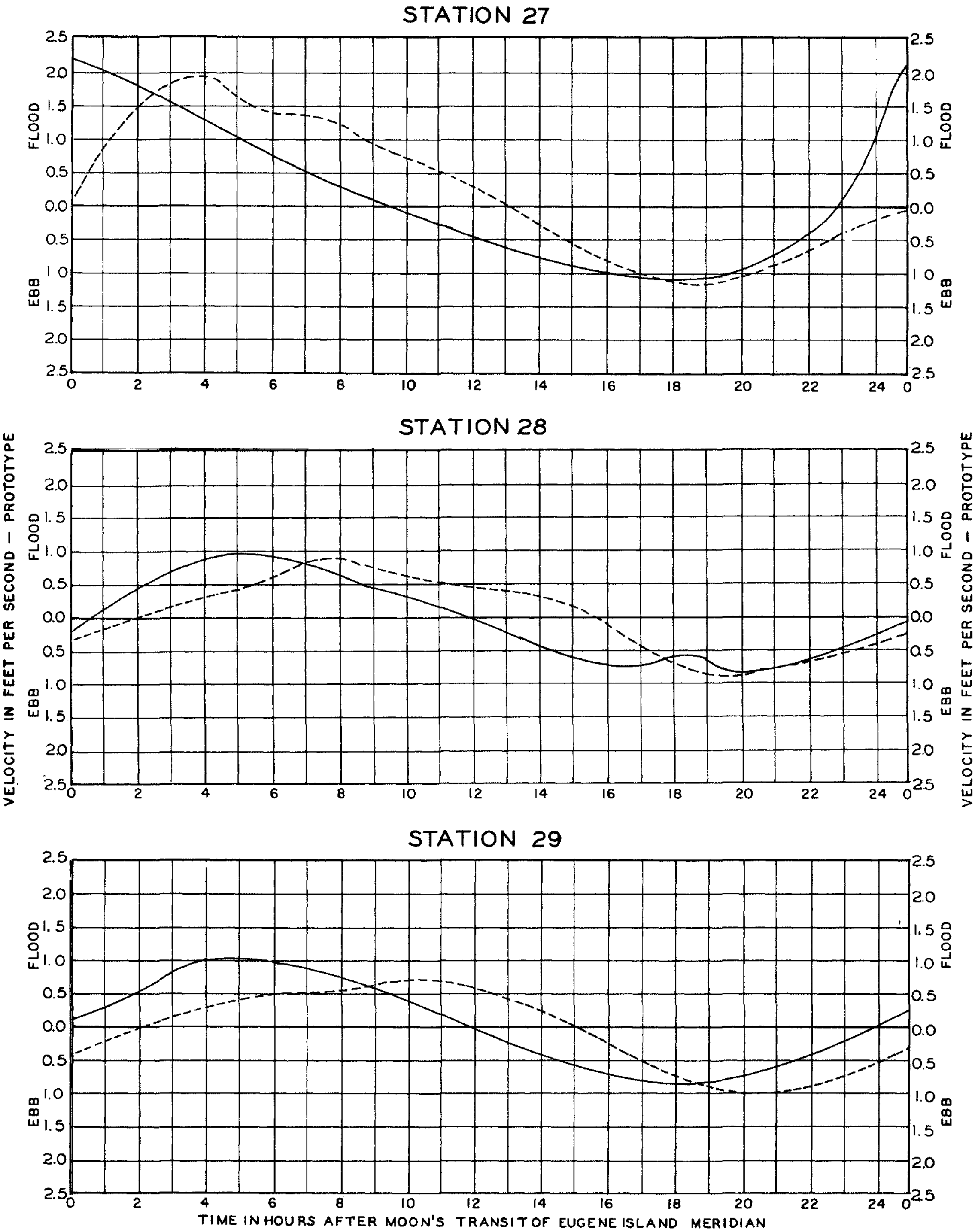
EUGENE ISLAND, SALT POINT AND CYPREMORT POINT



TIDAL HEIGHTS

EFFECTS OF CLOSING SOUTHWEST PASS

BAY AND OCEAN SIDES OF CLOSURE



LEGEND

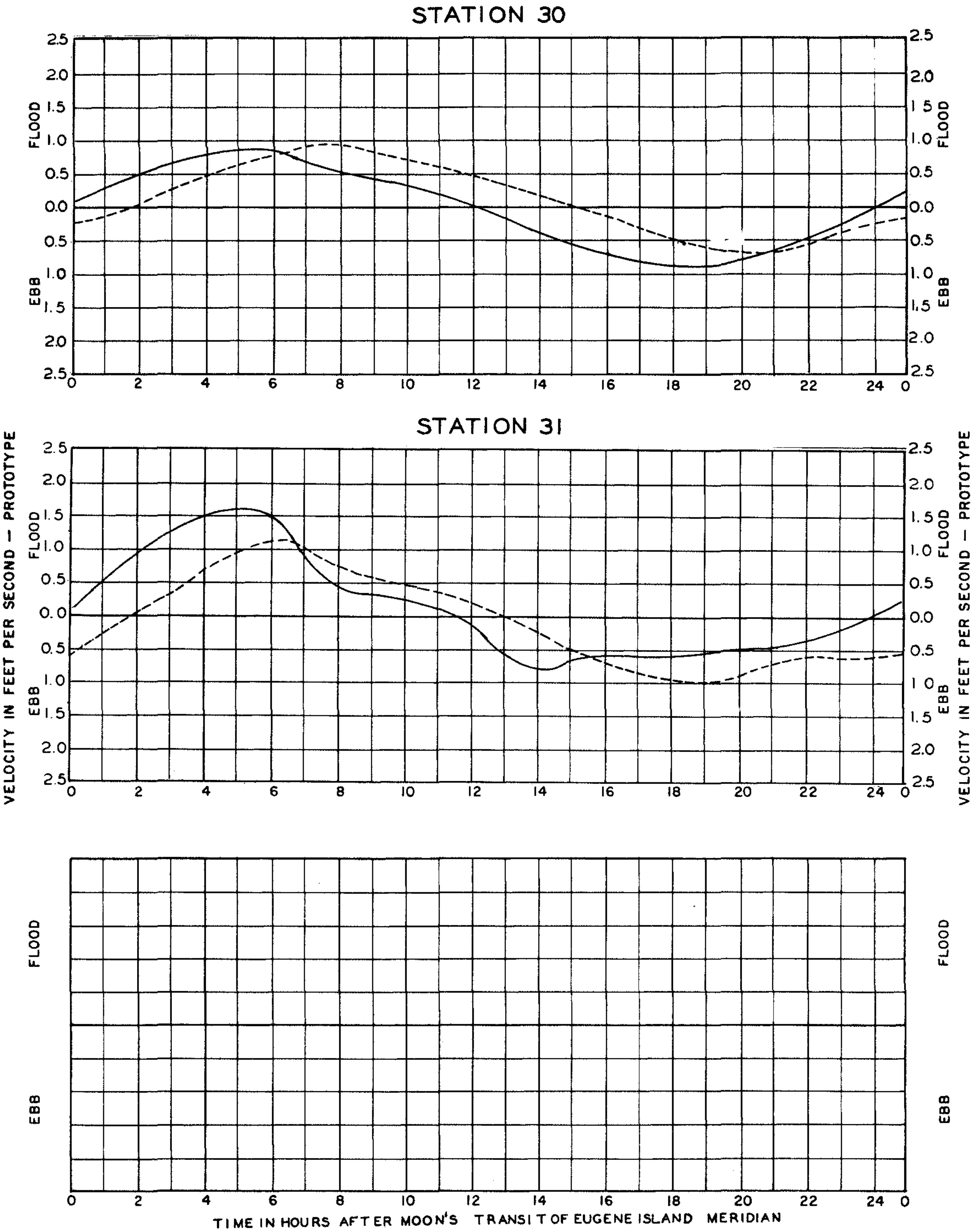
SOUTHWEST PASS OPEN ————

SOUTHWEST PASS CLOSED - - - - - -

CURRENT VELOCITY

EFFECTS OF CLOSING SOUTHWEST PASS

STATIONS 27, 28, AND 29



LEGEND

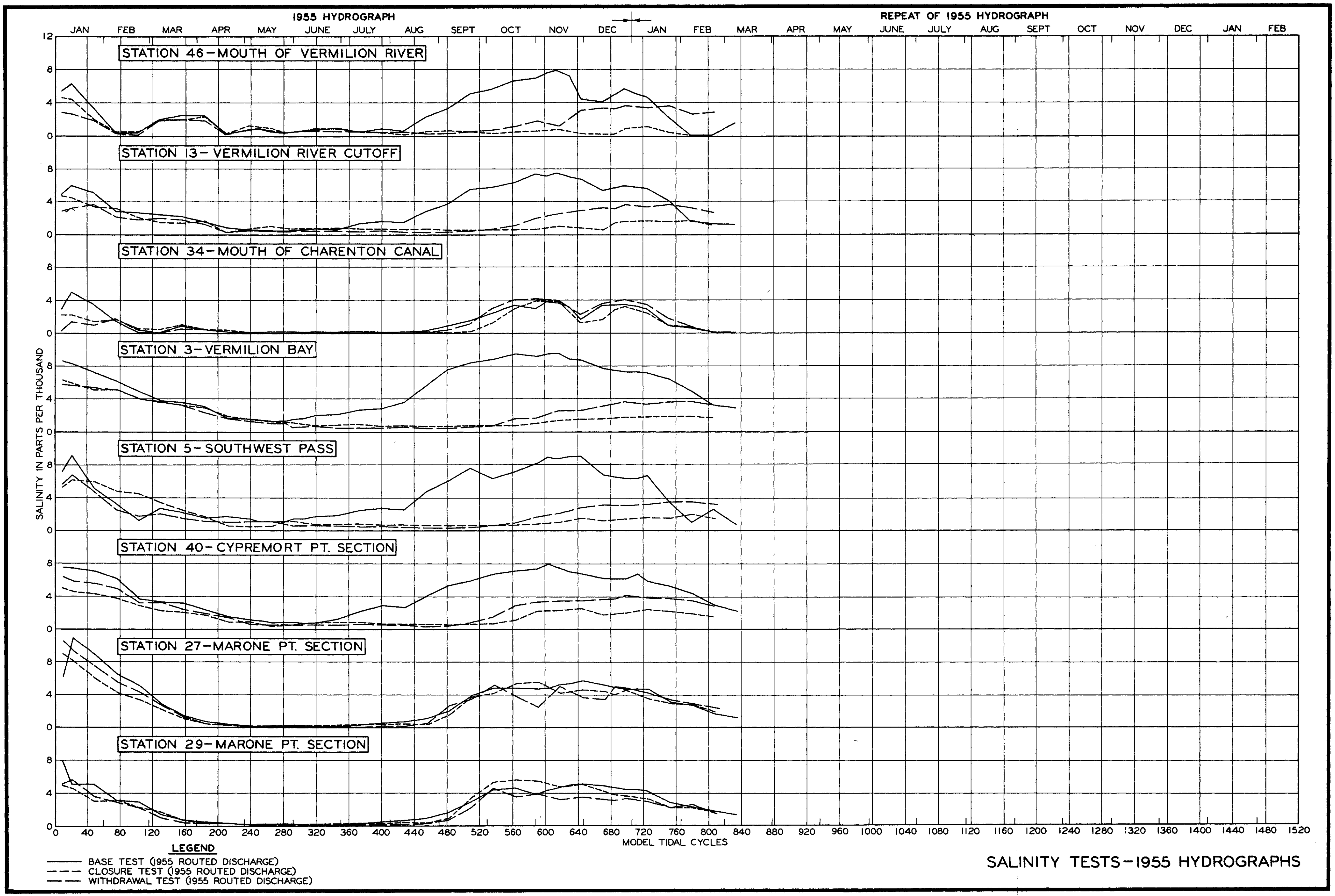
SOUTHWEST PASS OPEN ————

SOUTHWEST PASS CLOSED ------

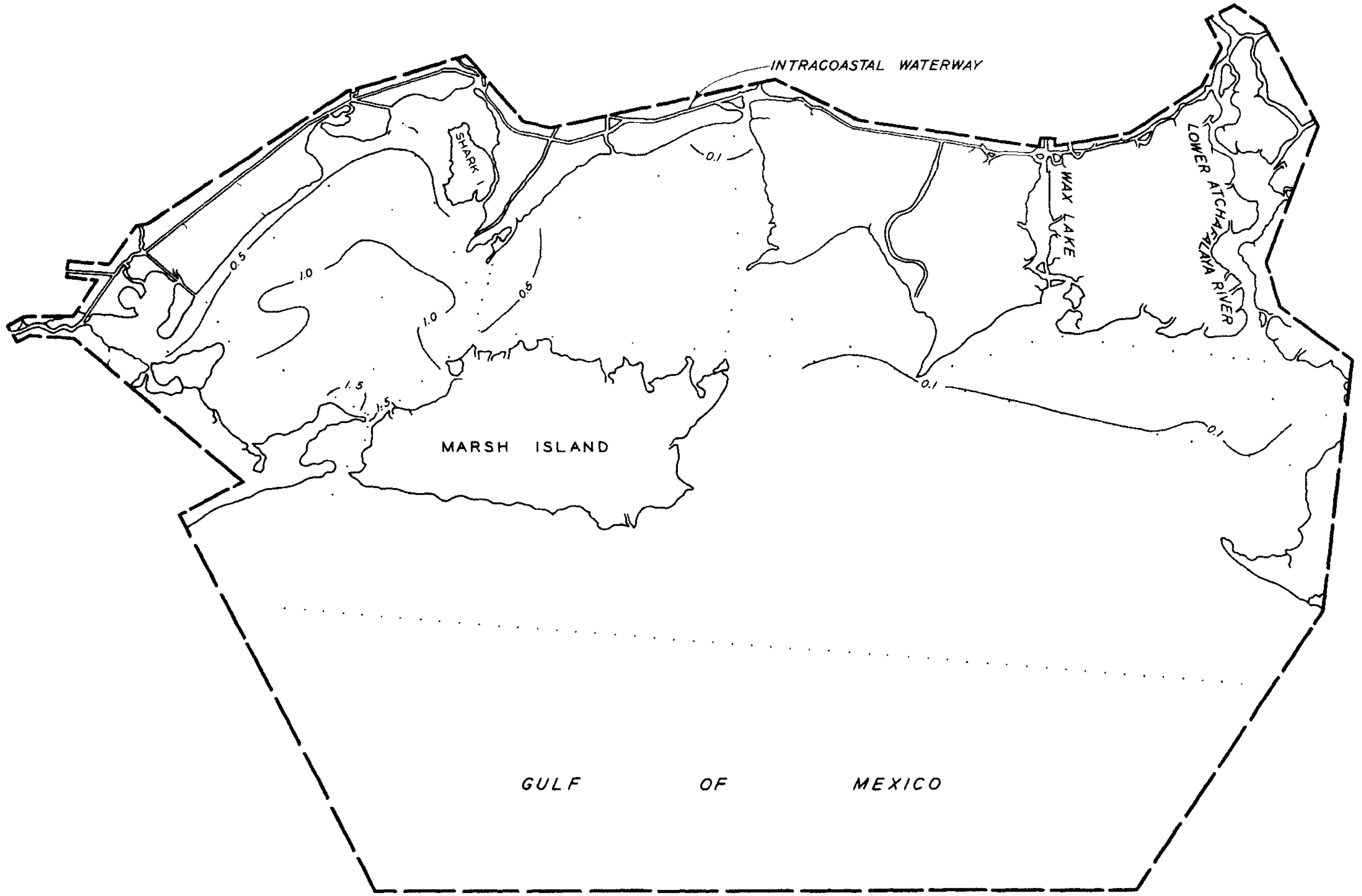
CURRENT VELOCITY

EFFECTS OF CLOSING SOUTHWEST PASS

STATIONS 30 AND 31



SALINITY TESTS-1955 HYDROGRAPHS



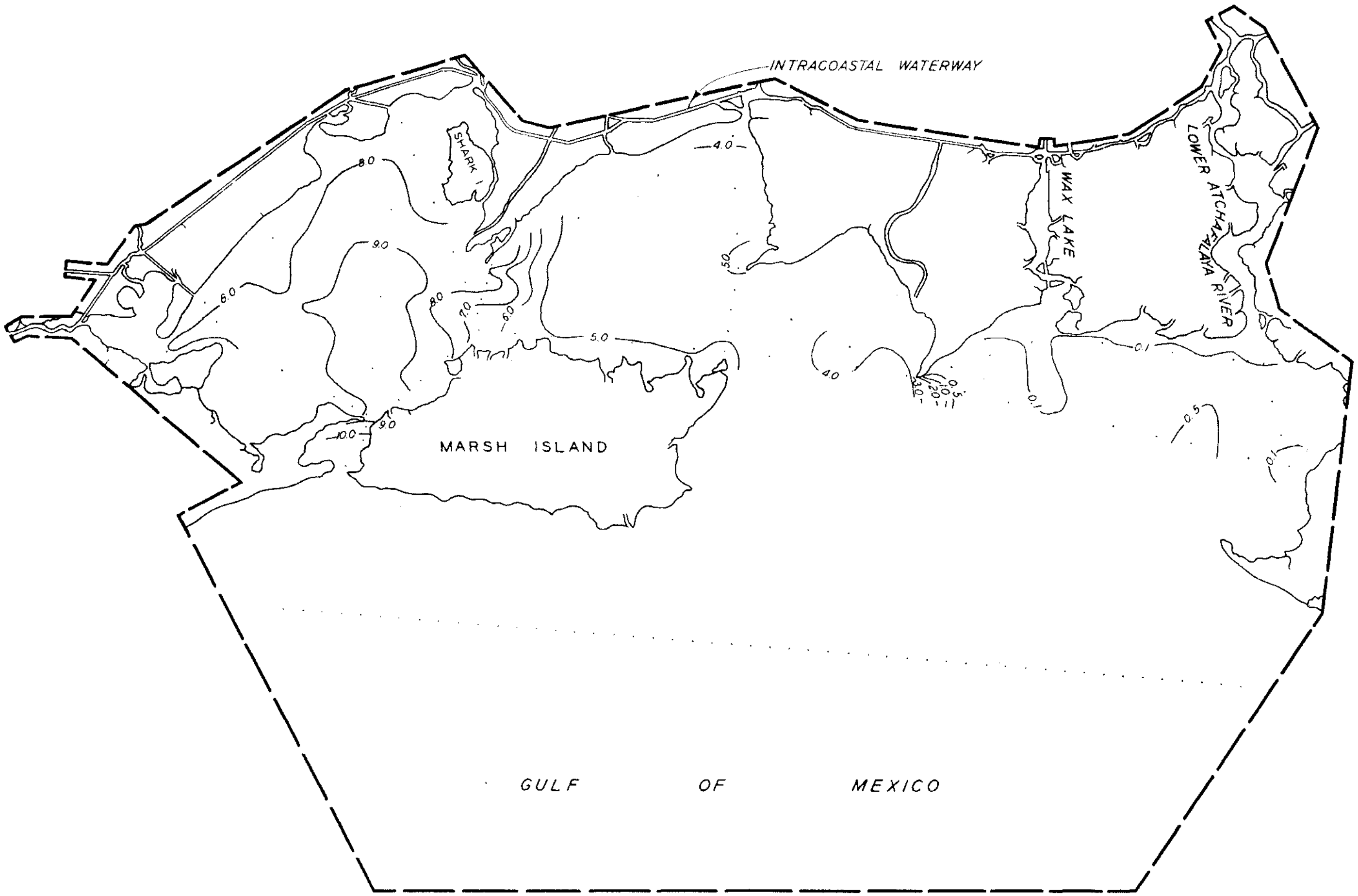
BASE TEST
ROUTED 1955 DISHARGE
LOW SALINITY SURVEY

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

PLATE 74

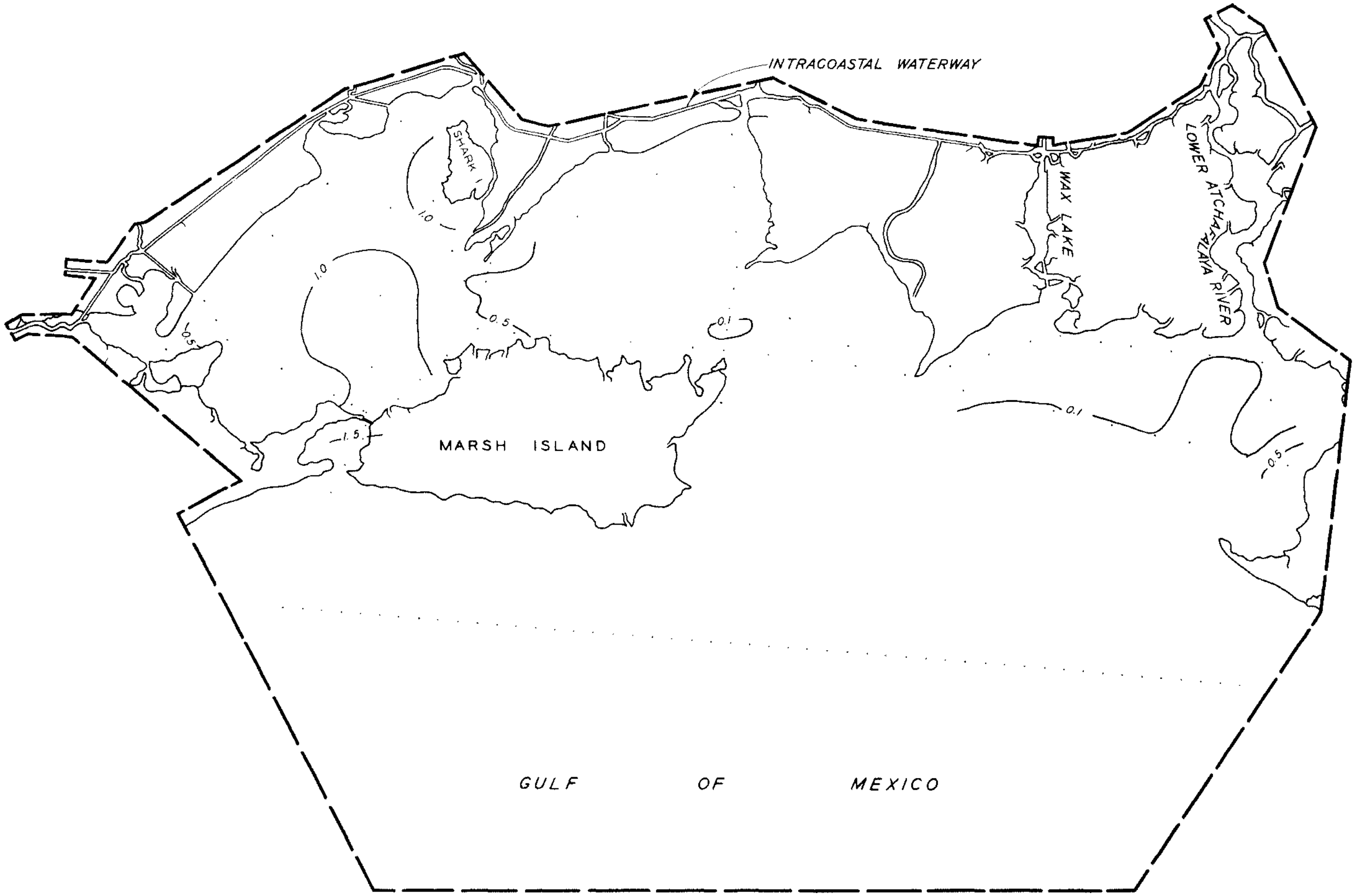


BASE TEST
ROUTED 1955 DISCHARGE
HIGH SALINITY SURVEY

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT



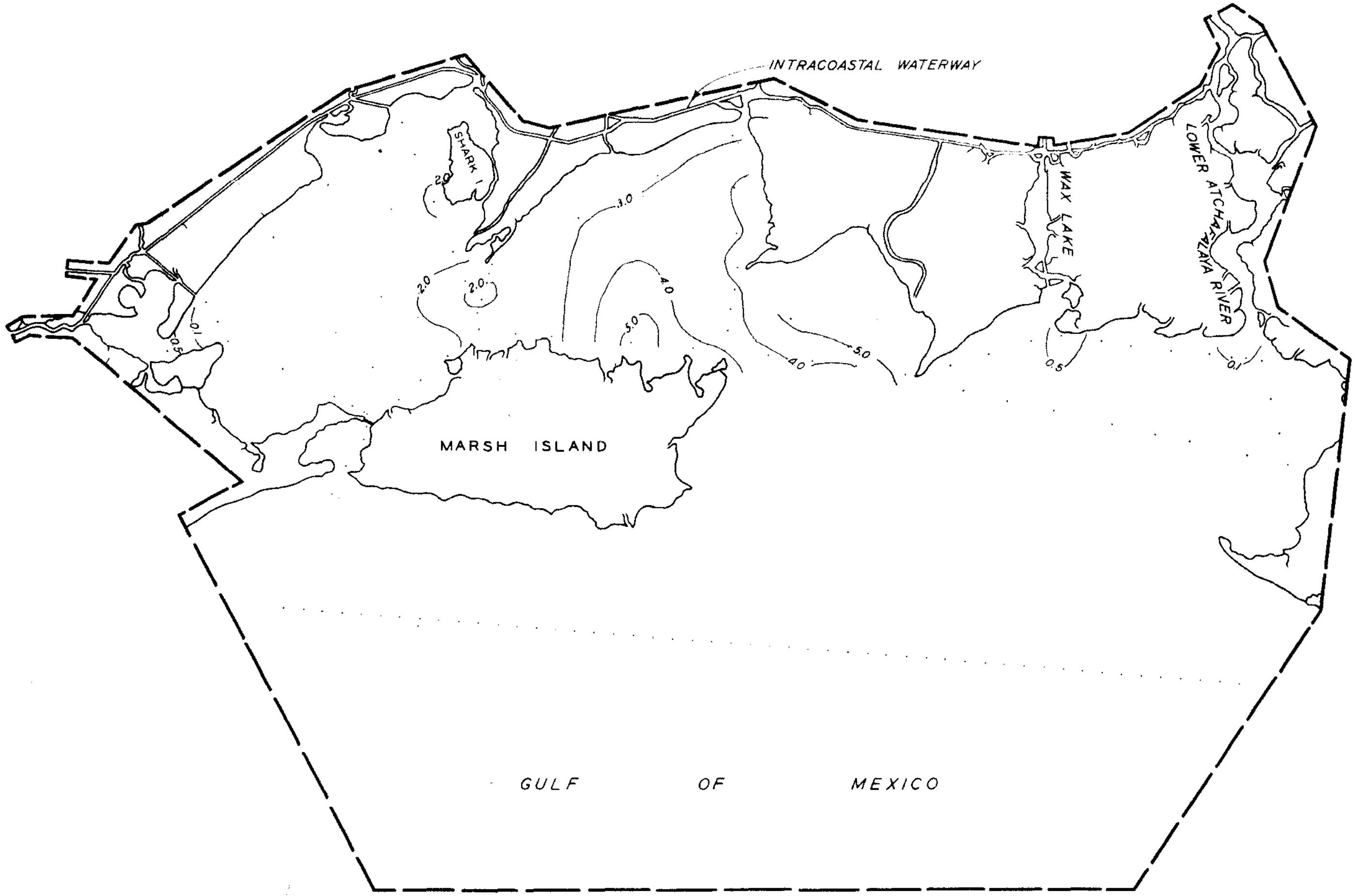
NOTE: ISOCHLORS IN PARTS PER THOUSAND

CLOSURE TEST
ROUTED 1955 DISCHARGE
LOW SALINITY SURVEY

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT

PLATE 77



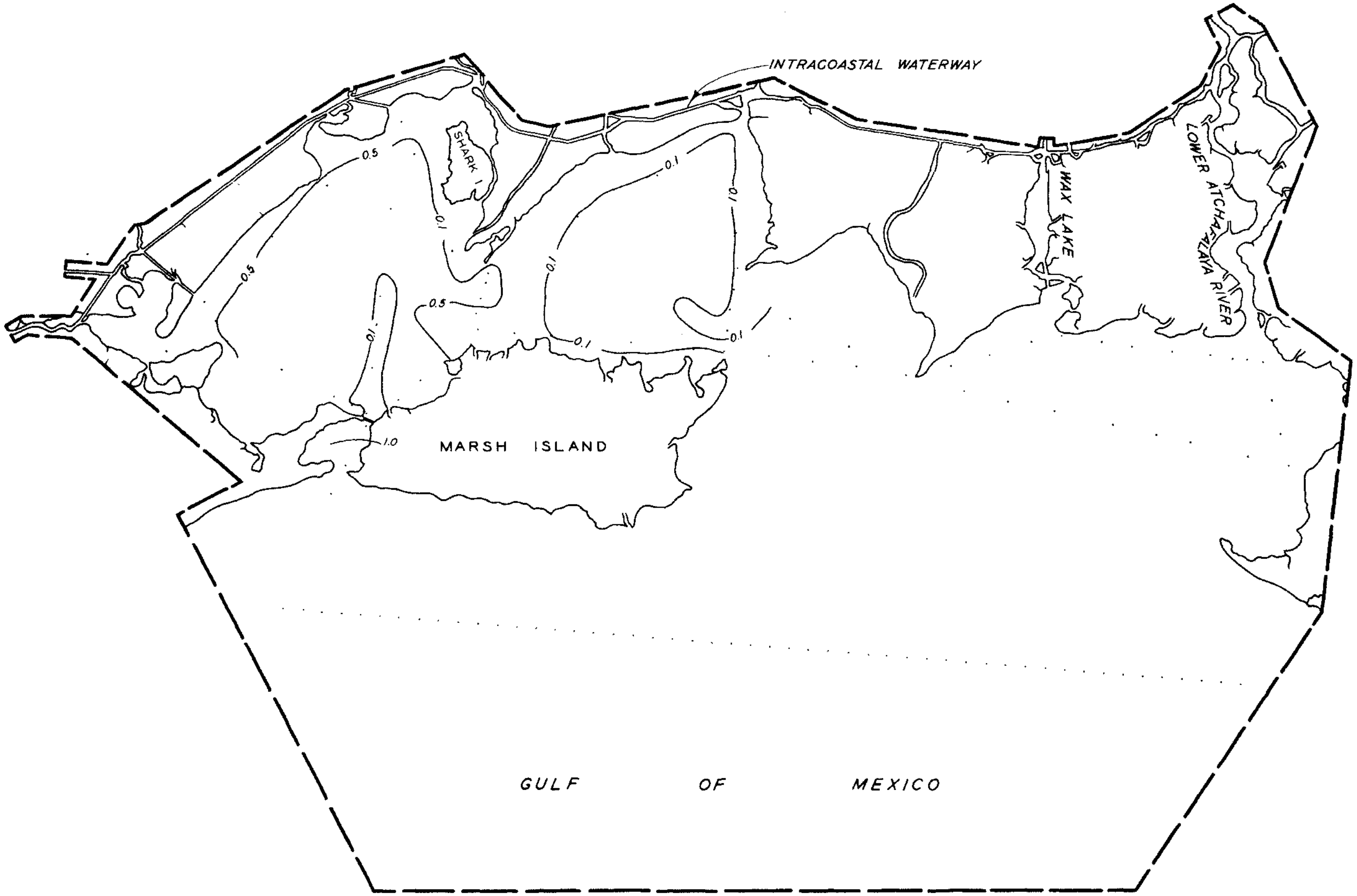
NOTE: ISOCHLORS IN PARTS PER THOUSAND.

CLOSURE TEST
ROUTED 1955 DISCHARGE
HIGH SALINITY SURVEY

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT



WITHDRAWAL TEST
ROUTED 1955 DISCHARGE
LOW SALINITY SURVEY

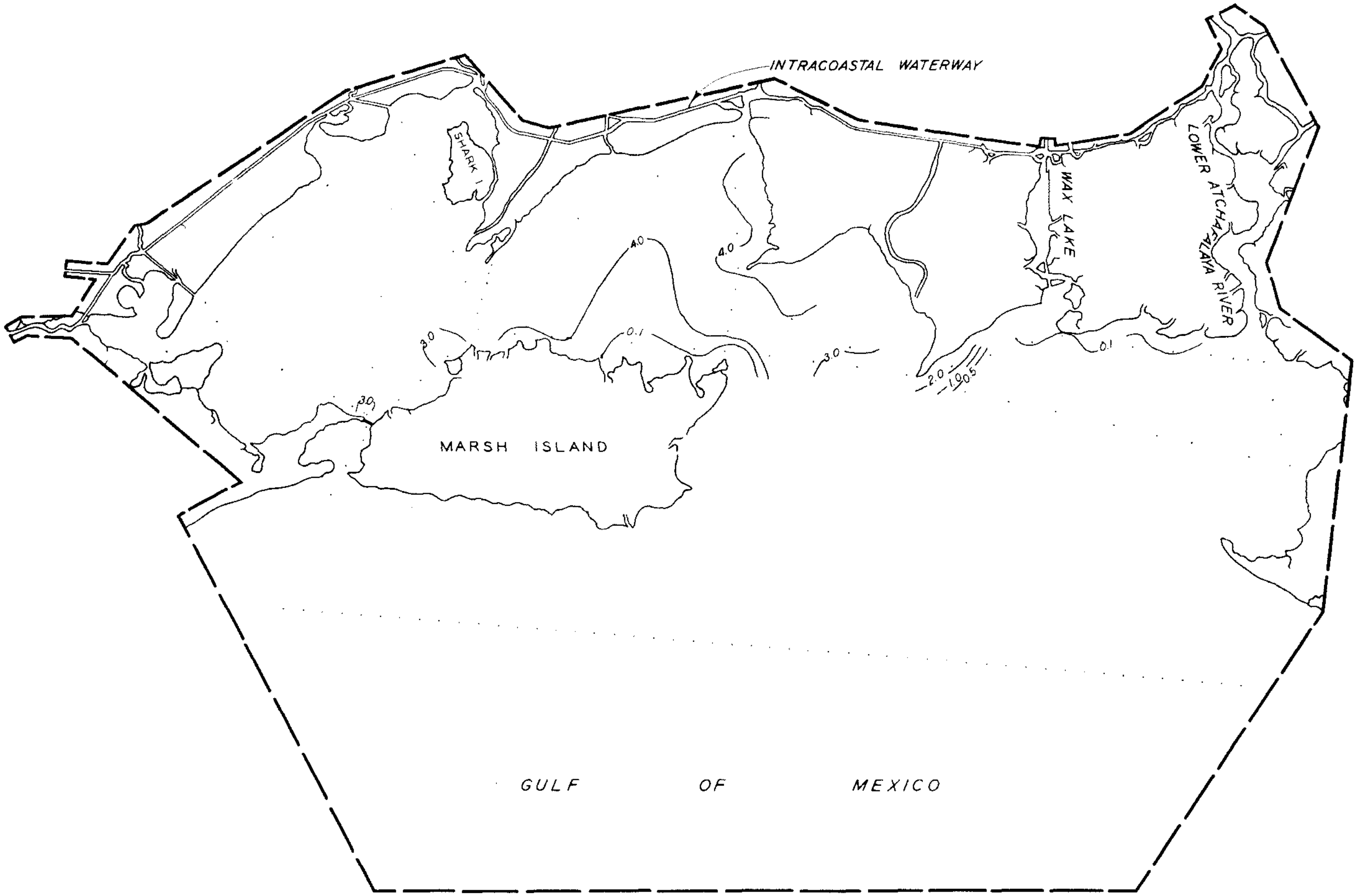
SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT

MODEL 10 0 10 20 30 FT

NOTE: ISOCHLORS IN PARTS PER THOUSAND.

PLATE 79

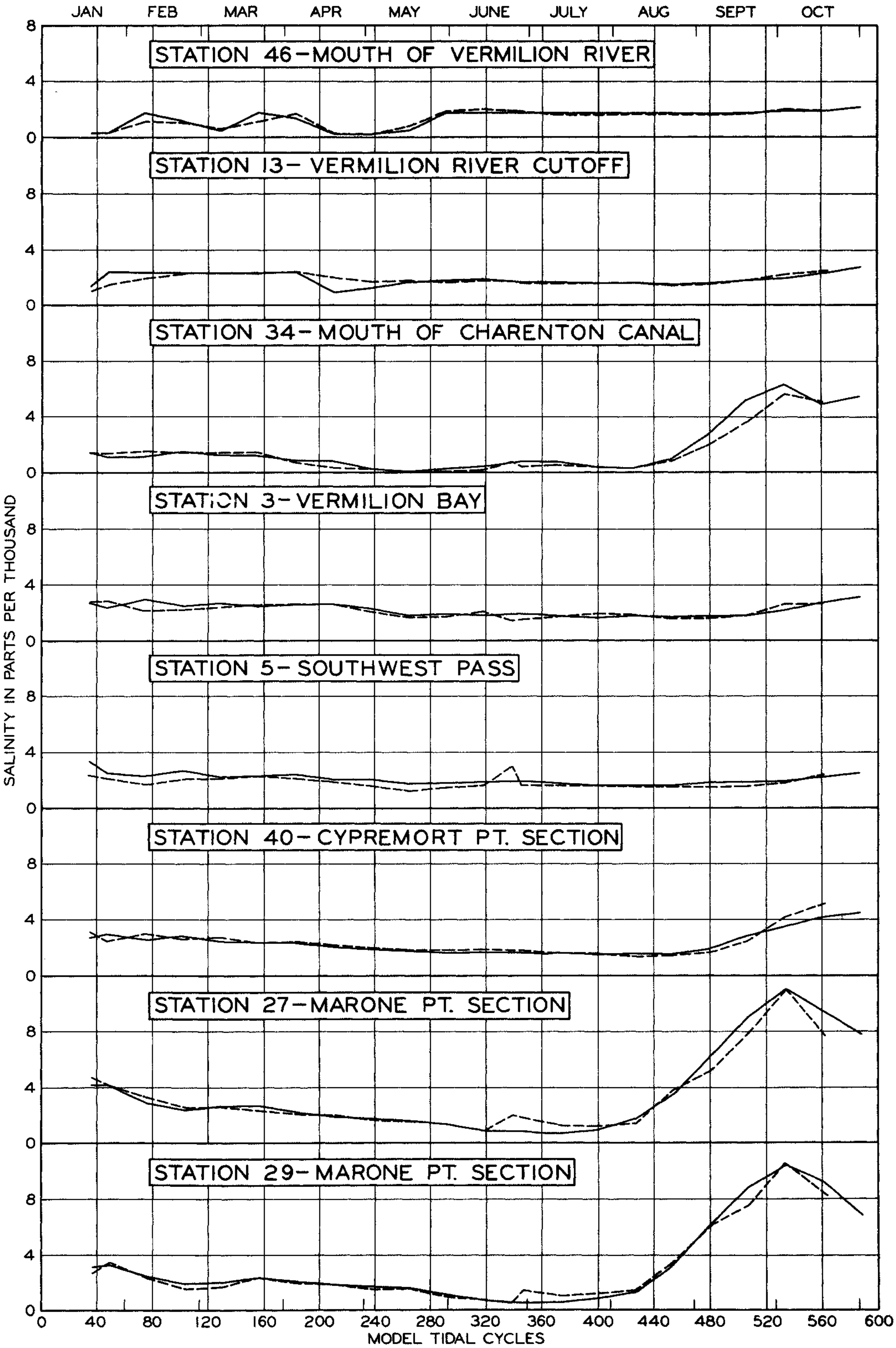


WITHDRAWAL TEST
ROUTED 1955 DISCHARGE
HIGH SALINITY SURVEY

SCALE

PROTOTYPE 20,000 0 20,000 40,000 60,000 FT
MODEL 10 0 10 20 30 FT

NOTE: ISOCHLORS IN PARTS PER THOUSAND.



LEGEND

—— BASE TEST, 1954 ROUTED DISCHARGE

– – – HURRICANE TIDE TEST

NOTE: HURRICANE OF 20 SEPT 1947.

HURRICANE TIDE TEST